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Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE

BULLETIN NO. 287.

REPORT

OF THE

Governors' Tri-State Milk Commission

TO

HONORABLE MARTIN G. BRUMBAUGH,
Governor of Pennsylvania

HONORABLE EMERSON C. HARRINGTON,
Governor of Maryland

HONORABLE JOHN G. TOWNSEND,
Governor of Delaware

BY THE

MILK COMMISSIONS OF

PENNSYLVANIA	MARYLAND.	DELAWARE
Morris T. Phillips	G. H. Alford	George H. Hall
C. E. Carothers	D. G. Harry	Harry Hayward
C. Henderson Supplee	Hartman K. Harrison	Frederick Brady
Clyde Lyndon King	Harry R. Witter	Samuel M. Harrington
	J. P. Aikenhead	

Officers of the Governors' Tri-State Milk Commission

CLYDE LYNDON KING	C. HENDERSON SUPPLEE	CLARENCE SEARS KATES
Chairman	Secretary-Treasurer	Honorable Financial Secretary

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1917

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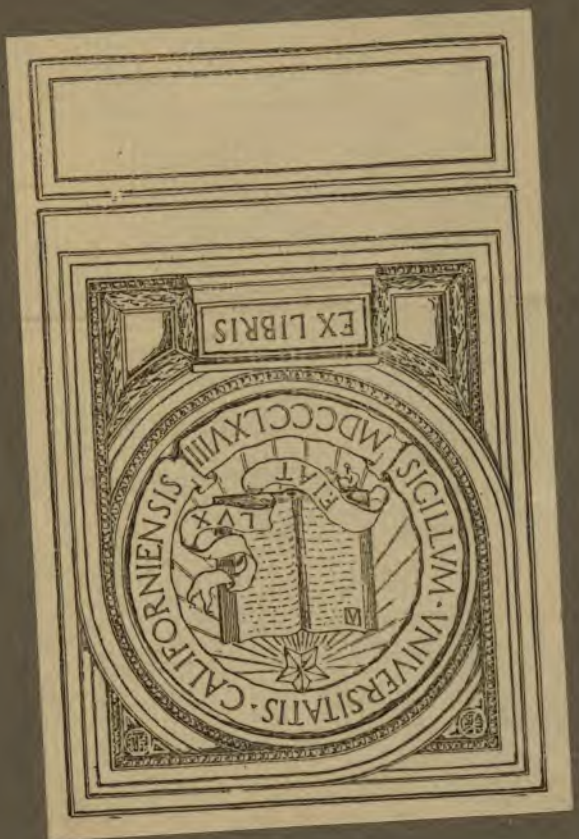
Gaylord Bros.
Makers
Syracuse, N. Y.
PAT. JAN. 21, 1908



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1917

CALIFORNIA

SF

CALIFORNIA

SUMMARY.

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FOREWORD

HONORABLE MARTIN G. BRUMBAUGH,
Governor of Pennsylvania.

Sir: The members of your Commission met in Philadelphia on October 24, 1916, on the call of Mr. C. E. Carothers. The chairman of the commissions appointed by the Governors of Maryland and Delaware had called the first meeting of their commissions at the same place and hour. After reading of instructions and credentials and after the consideration of the identical problems confronting each of the three commissions, it was decided to effect a joint organization for the effective prosecution of our work. The officers chosen for the joint commission were: Clyde L. King, Chairman; C. Henderson Supplee, Secretary-Treasurer; Clarence Sears Kates, Honorary Financial Secretary.

This joint organization, designated as "The Governors' Tri-State Milk Commission," was decided upon as the most economical means and also the most effective method of carrying out the duties you charged us with. All of our deliberations have been in joint session and our investigations all conducted under these joint auspices. Your Commission has now the honor to submit this report, identical with the report concurrently submitted to their respective Governors by the Commissions of Maryland and Delaware.

Not only are the reports of the three commissions identical, but the conclusions and the recommendations contained therein have been unanimously adopted by all the members of all three commissions.

Public hearings were held in joint session at Philadelphia on November 3 and November 20, and in Baltimore, on November 15. In addition to this, the Commission has taken testimony from many experts. The work was divided up among the following committees, each of which has had complete charge of the sections of this report corresponding thereto. The Commissions, however, have, as a whole, acted upon the Committees' findings and recommendations, making them their own.

CALIFORNIA

THE COMMITTEES OF THE GOVERNORS' TRI-STATE MILK COMMISSION.

Production.

Professor G. H. Alford, Chairman,
(Maryland State College)
College Park, Md.

Harry B. Witter,
Frederick, Md.

Dr. J. P. Aikenhead,
Easton, Md.

C. Henderson Supplee,
Philadelphia

C. E. Carothers,
Harrisburg, Pa.

Frederick Brady,
Middletown, Del.

Surplus and By-Products.

D. G. Harry, Chairman,
Pylesville, Md.

Frederick Brady,
Middletown, Del.

Samuel M. Harrington,
Dover, Del.

Morris T. Phillips,
Pomeroy, Pa.

Distribution.

(Including Transportation and Sources of Supply)

Morris T. Phillips, Chairman,
Pomeroy, Pa.

C. Henderson Supplee,
Philadelphia

Hartman K. Harrison,
1501 Argyle Ave., Baltimore, Md.

Dean Harry Hayward,
Newark, Del.

Grading.

(Including Laws and Regulations)

Dean Harry Hayward, Chairman,
(Delaware State College)
Newark, Del.

Hon. George H. Hall, Secretary of State,
Dover, Del.

Morris T. Phillips,
Pomeroy, Pa.

Hartman K. Harrison,
1501 Argyle Ave., Baltimore, Md.

The Food Value of Milk

Frederick Brady,
Middletown, Del.

C. E. Carothers,
Harrisburg, Pa.

Samuel M. Harrington,
Dover, Del.

The Chairman and Secretary were made ex-officio members of all committees. This report discusses the subjects under the following headings: Production, Distribution, Surplus Milk Supply, Grading, Food Value of Milk and Summary of Recommendations.

PRODUCTION COSTS

COMMITTEE IN CHARGE: G. H. Alford, Maryland, *Chairman;* Harry B. Witter, Maryland; J. P. Aikenhead, Maryland; Clyde L. King, Pennsylvania; C. Henderson Supplee, Pennsylvania; C. E. Carothers, Pennsylvania; Frederick Brady, Delaware; *Special Investigator*, R. G. Tugwell, University of Pennsylvania.

At the public hearings held by the Commissions in Philadelphia on November 3 and November 20 and in Baltimore on November 15, evidence was taken from dairymen and farmers as to their production costs. Questionnaires, a copy of which is given hereafter with the results, had been previously sent out to county agents and others for distribution. Letters of request, enclosing copies of this questionnaire, were sent at that time and later to farmers and dairymen in all three states. As a result, the Commission got promptly itemized statements as to the costs of producing milk from 226 farmers and dairymen, thus showing that a gratifying proportion of dairy farmers keep accurate cost records. These records are particularly accurate as to feeds because members of cow testing associations have for some time been keeping the records of feed costs on approved forms. More reported on feed costs than on any other single item. In the 226 reporting are included 101 farmers from Blair county, Pennsylvania, whose figures were collected and reported together by Mr. R. Bruce Dunlop, county agent of that county. The methods used by Mr. Dunlop in collecting these data are set forth in the letter given in full below.

Blair County Farm Bureau,
Altoona, Pa., November 2, 1916.

Dr. Clyde L. King,
Logan Hall, University of Pennsylvania,
Philadelphia, Pa.

Dear Sir:

I am filling out the blanks sent me in regard to the hearing for the milk producers to be held on Friday, November 3. The time is very short to get this material to the producers and depend upon them filling out the same and returning them. I would gladly have done this, but in order that you may have some data from our county, I shall fill in the average figures which were gotten through a survey of 101 farms in the county. All these farms shipped milk. The figures were gotten by a thoroughly reliable man

and I think represent our conditions. Only feed costs, however, were gotten in this way. The other figures are taken largely from Cornell Bulletin No. 364, being a summary of a survey made of 174 hill farms in Delaware county, New York. I trust that the figures will be satisfactory. I might add that the figures in the Cornell Bulletin No. 364 were the lowest we could find as given from any Experiment Station. We feel, therefore, that we are safely within the bounds in giving out the figures which we do. As a matter of fact, we have a feeling that it costs much more to produce milk in many cases than this data would indicate.

Very truly yours,

(Signed) R. BRUCE DUNLOP,
Extension Representative.

Not every dairyman answered every question. The average of all answers to each question follows. These answers, it must be remembered, are for the year ending September 30, 1916. Three columns are given. In the first column is the answer to the questions submitted by Mr. Dunlop for the 101 farmers of Blair county. The Blair county report, it must be remembered, is based on actual records for feed costs only. In the second column is the average of all the answers to questions by all other farmers or dairymen. In the third column is the average of all counting the Blair county report as 101 farmers. The total number reporting on each question in addition to the 101 is given in parenthesis in the second column. These costs, it must be remembered, are those as reported by the dairy farmers. The figures can in no sense be taken as the exact cost of producing milk in the State of Pennsylvania or in either of the other two states because no one figure will ever represent the cost of producing milk in any one state or in any section of a state. But that these figures are both typical and significant there can be no doubt.

Production Costs for Year Ending September 30, 1916.

	The 101 Blair county farmers.	All others reporting.	Average.
(1) What is the average annual cost per cow to produce milk,*	$111 95	$165 65 (61)	$128 34 (161)
(a) Barns, land, equipment, etc.,	5 48	14 98 (60)	9 04 (160)
(b) Cost and depreciation of cows,	6 70	15 79 (58)	10 03 (158)

Production Cost, etc.—Continued.

	The 101 Blair county farmers.	All others reporting.	Average.
(c) Cost of food per cow,	65 15	78 37 (80)	71 03 (180)
(d) Cost of labor,	20 18	29 25 (74)	24 03 (174)
(e) Cost of delivery to shipping or delivery point,	6 02	7 76 (52)	6 61 (152)
(f) Any special costs for premium milk,	.....	5 00 (6)	5 00 (6)
(g) Special additional costs,	8 40	12 81 (39)	9 63 (139)
(2) What is the average yearly income per cow from your herd,†	$105 30	$170 42 (59)	$129 46 (159)
(a) Milk, cream, butter, skim milk and butter milk,	88 59	115 56 (65)	99 01 (165)
(b) Calves,	4 00	13 41 (73)	7 97 (173)
(c) Manure,	9 42	14 29 (51)	11 06 (151)
(d) Sale of cattle other than calves,	3 28	35 55 (16)	7 73 (116)
(3) What is the average yearly output per cow in qts.,	2,355	2,925 (85)	2,616 (185)
(4) What is the average cost per qt. of milk,	.04	.053 (86)	.046 (186)
(5) What is the average price you receive per qt. of milk,	.037	.042 (84)	.039 (184)
(6) Loss per qt. of milk,‡	.003	.011	.007

*This is the average of the answers submitted by the dairy farmers to this particular question. The totals of the items following (a) to (g) inclusive would be as follows for each of these columns: 101 Blair County farmers, $111.93; all others reporting, $163.96, average of all, $135.36.

†This is the average of the answers submitted by the dairy farmers to this particular question. The totals of the items following (a) to (d) inclusive would be as follows for each of these columns: 101 Blair County farmers, $105.29; all other reporting, $178.81, the average of all farmers reporting, $125.77.

‡This is the result obtained by subtracting the average of answers to question 5 from the average of answers to question 4. As to the actual answers submitted by farmers to this question, the 101 farmers of Blair County report a loss of $.003; of all others reporting (66 in number) 41 reported a loss on the average of $.011 and 25 an average profit of $.008; counting the 101 Blair County farmers as 101 (making 166 in all) 141 reported a loss of $.007 per quart.

Other Information Desired.

	The 101 Blair county farmers.	All others reporting.	Average.
(1) What is the net price for milk you or the members of your association received at shipping or delivery points for each month during the year ending Sept. 30, 1916.			
October,	.....	.....	$.043 (30)
November,	.....	.....	.044 (30)
December,	.....	.....	.040 (30)
January,	.....	.....	.040 (30)
February,	.....	.....	.042 (30)
March,	.....	.....	.042 (30)
April,	.....	.....	.041 (30)
May,	.....	.....	.039 (30)
June,	.....	.....	.038 (30)
July,	.....	.....	.039 (29)
August,	.....	.....	.040 (29)
September,	.....	.....	.041 (29)
Average,*	.037	.039 (88)	.038 (188)
(2) How does it compare with the average price of milk for the years:			
(a) 1900-1910,	.....	.037 (28)	.037 (28)
(b) 1910-Sept. 30, 1916,	15-20%	.036 (44)	.036 (44)
(3) What has been the increase, if any, in the price of cows from:			
(a) 1900-1910,	.....	28% (40)	28% (40)
(b) 1910-Sept. 30, 1916,	80%	60% (80)	71% (180)
(4) What has been the per cent. of increase in the cost of labor connected with farm and dairy work.			
(a) 1900-1910,	.....	28.6% (35)	28.6% (35)
(b) 1910-Sept. 30, 1916,	90%	46.97% (85)	70.2% (185)
(5) What was the increase if any in the average yearly price of all grains and roughage per cow for 1916 compared with:			
(a) 1900-1910,	.....	28.7% (31)	28.7% (31)
(b) 1910-Sept. 30, 1916,	33 1-3%	41.05% (69)	36.4% (169)
(6) Give the feeds and proportions used in your rations including grains and roughage,	†	†	†
(7) What proportion of the dairymen in your section have silos,	30%	41% (92)	35.4% (192)

*The average of the answers submitted not of the monthly averages.
†The answers to this question were not compilable.

Other Information Desired—Continued.

	The 101 Blair county farmers.	All others reporting.	Average.
(8) Are you a member of a cow testing association:			
Yes,	100%	59% (161)	35% (201)
No,	.....	69% (101)	65% (201)
(9) Do you keep a record of the milk produced by each cow:			
Yes,	100%	59% (161)	79% (261)
No,	.....	41% (42)	21% (261)
(10) What is the average annual output per head of your herd,	2,266.7 qts.	3,093.9 qts. (71)	2,610 qts. (171)
(11) What breed of cows have you in your herd:			
One hundred farmers answered this question. The following single breeds or combinations of breeds were given:			
Guernsey, ... 14			
Holstein, ... 34			
Jersey, ... 10			
Jersey & Guernsey, ... 2			
Swiss, Holstein & Jersey, ... 1			
Swiss, Holstein & Guernsey, ... 1			
Ayrshire, ... 1			
Holstein & Jersey, ... 4			
Native cows, preference given to Durhams, ... 1			
Durham, Jersey & Holstein, 1			
Holstein, Jersey & Guernsey, ... 3			
Holstein & Guernsey, ... 18			
Holstein & Fresian, ... 2			
Holstein & mixed, ... 1			
Mixed, ... 7			
Mr. Dunlop replied for the 101 farmers of Blair county "largely grades."			
(12) How do you apportion your overhead expenses as to barns, and other equipment:			
(a) To cows,	•	•	•
(b) To horses,	•	•	•
(c) To other animals,	•	•	•
(13) Do you arrange to have your cows freshen at different times of the year:			
Yes,	.....	64.4%	64.4%
(14) (a) How many qts. does your herd produce:			
(1) In May,	.....	5,262.9(66)	5,262.9(66)
(2) In June,	.....	5,015.7(67)	5,015.7(67)
(3) In July,	.....	4,603.8(67)	4,603.8(67)
(b) How many qts. does your herd produce:			
(1) In October,	.....	4,015.9(66)	4,015.9(66)
(2) In November,	.....	4,619.4(61)	4,619.4(61)
(3) In December,	.....	4,300.3(58)	4,300.3(58)
(15) How is your milk delivered to shipping or delivery point (whether you take it yourself or do it cooperatively) and what is the cost.			
Three-fourths of the farmers take the milk themselves. For cost of delivery see the answers to question 1, page 11.			

Certain items in the averages call for special comment. In the first place, the answer to question eleven indicates that those reporting owned typical herds. Examples of variations in the items of cost and of income per cow per year are: The costs for "barns, lands and equipment" ranged from $3 per cow to $53 per cow with half about $15. Depreciation charges ranged from $3 to $36, with one-third about $18. Cost of feed ranged from $20 to $116.80, one-third being around $80. Labor ranged from 3 to $66.60, one-half reporting around $25. Delivery charges ran from $1.27 to $19 one-third being around $10. Premium and special costs ran from $1 to $10, the average being $5 (6 reported on this question). Additional costs ranged from $.25 to $124.51, one-fourth being around $10.

As to income, milk and cream receipts ran from $40 up to $224.49, one-fourth* being around $125. Calves ranged from $2 up to $70, one-fourth being around $10. Manure ranged from $2 up to $65.50, one-half being around $15. The sale of cattle ranged from $2 to $200, one-fourth* being around $10.

As to the average cost of producing a quart of milk, 19 reported it as $.03; 33 reported it as $.04; 22 reported it as $.05, and 7 as $.06. The Blair county farmers reported the cost as $.04.

There are many reasons for the variations in these costs. In the first place, it is evident that some of the farmers who did not keep accounts had no definite idea in regard to the cost of producing milk. One farmer reports $3.00 as the labor cost of keeping a cow. It is impossible to take care of a cow, feed and milk her for $3.00 per year. Secondly, to ask the cost of producing a quart of milk is much like asking the cost to raise a horse. All depends upon the horse. In the production of milk the costs vary not only with the content of fat and other solids and the care exercised in production but also with the cost of labor, the value of barns, and the cost and character of other equipment.

The Increasing Costs of Production

The cost of producing milk has been steadily increasing. Thus the testimony of the farmers' estimates as given in the above summary is that the cost of labor has increased 70% since 1910, while during the same period the cost of grain and roughage has increased 36% and the price of cows 71%. These increases have occurred in the main in the last year or two.

This autumn there has been an exceptional increase in feed costs and to a less extent in costs of labor. The increased cost of grains is due in part to the unprecedented demand from abroad, to short crops at home and to the industrial conditions that have led to

*In arriving at these estimates the 101 Blair County Report was counted as one farmer.

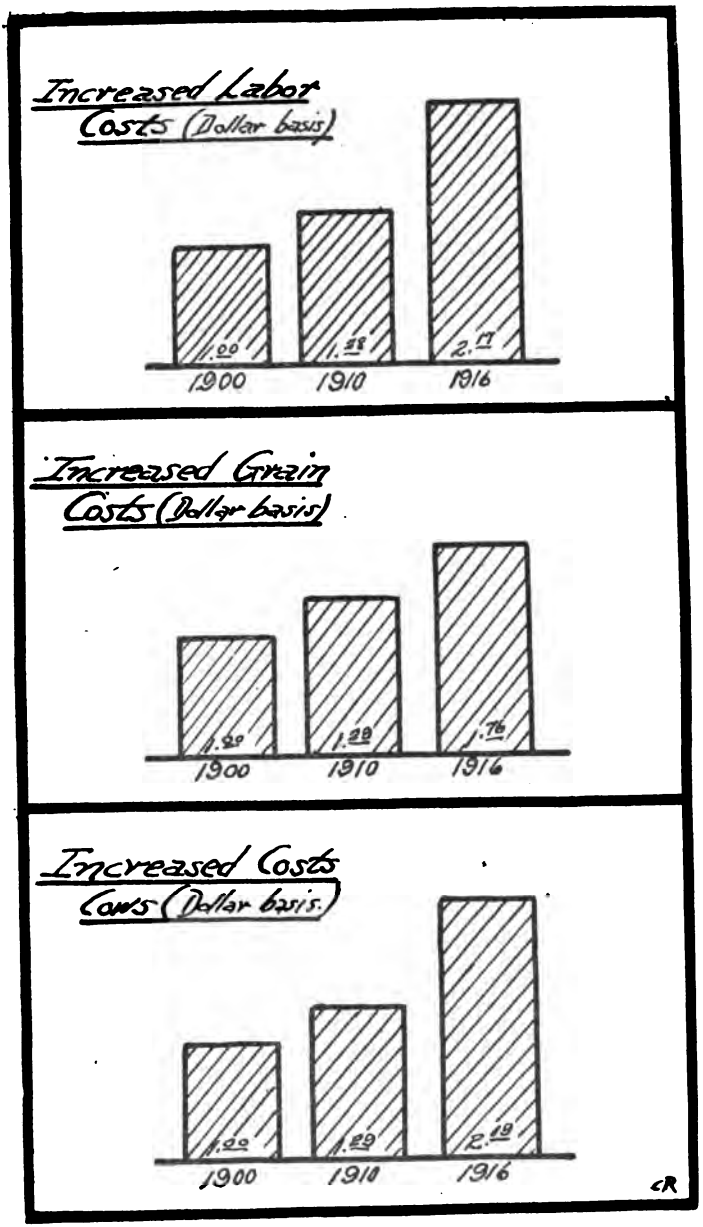

Increased Labor Costs (Dollar basis)
1.00
1.28
2.11
1900
1910
1916
Increased Grain Costs (Dollar basis)
1.00
1.28
1.76
1900
1910
1916
Increased Costs Cows (Dollar basis.)
1.00
1.29
2.19
1900
1910
1916
CR

CHART 1.

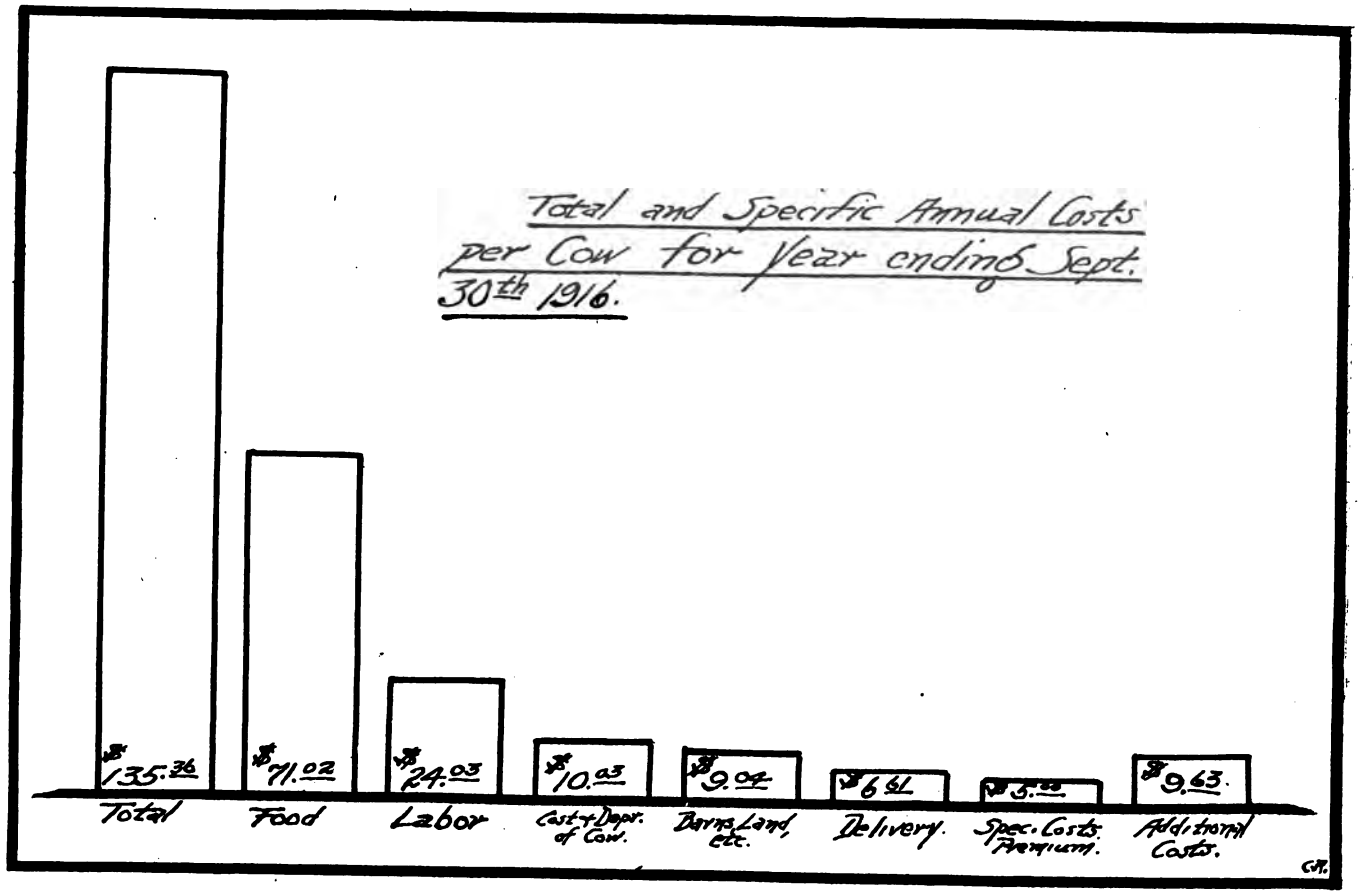

Total and Specific Annual Costs per Cow for Year ending Sept. 30th 1916.
$135.36
$71.02
$24.03
$10.03
$9.04
$6.41
$3.48
$9.63
Total
Food
Labor
Cost of Depr. of Cow.
Barns, Land, etc.
Delivery.
Spec. Costs: Premium.
Additional Costs.
C.M.

CHART 2.

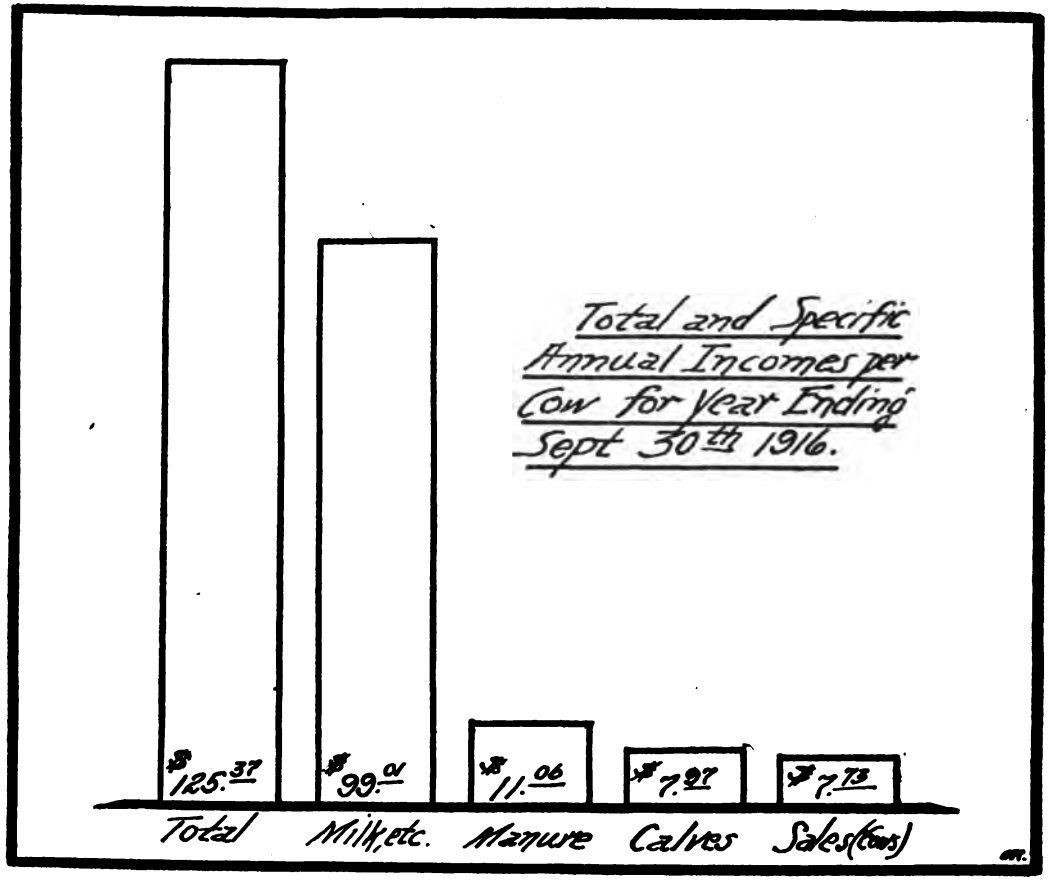

Total and Specific
Annual Incomes per
Cow for Year Ending
Sept 30th 1916.
$125.37
$99.01
$11.06
$7.27
$7.73
Total
Milk etc.
Manure
Calves
Sales(Cows)

CHART 3.

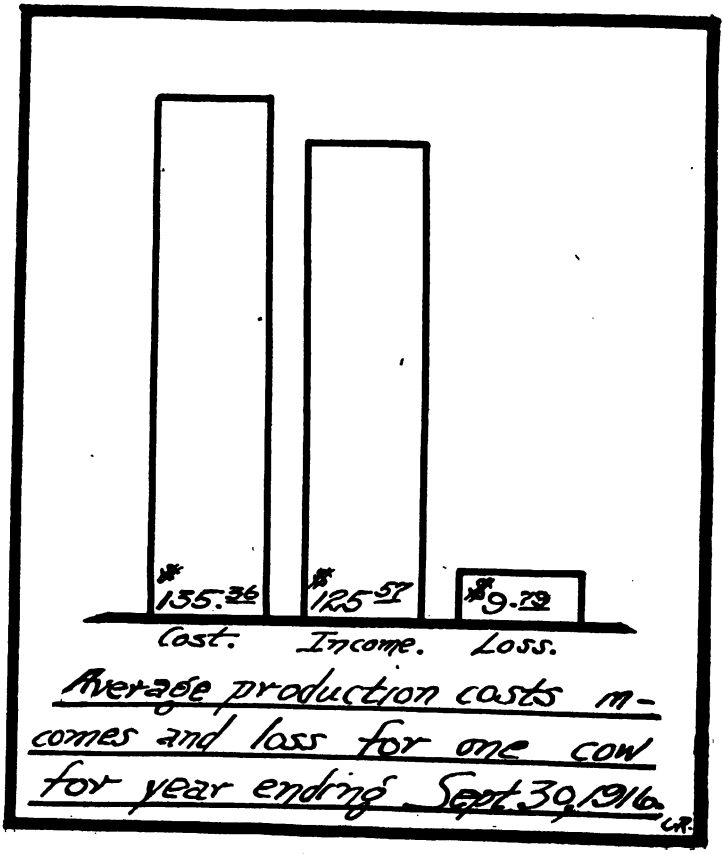

$155.26
$125.57
$9.79
Cost.
Income.
Loss.
Average production costs incomes and loss for one cow for year ending Sept. 30, 1916.

CHART 4

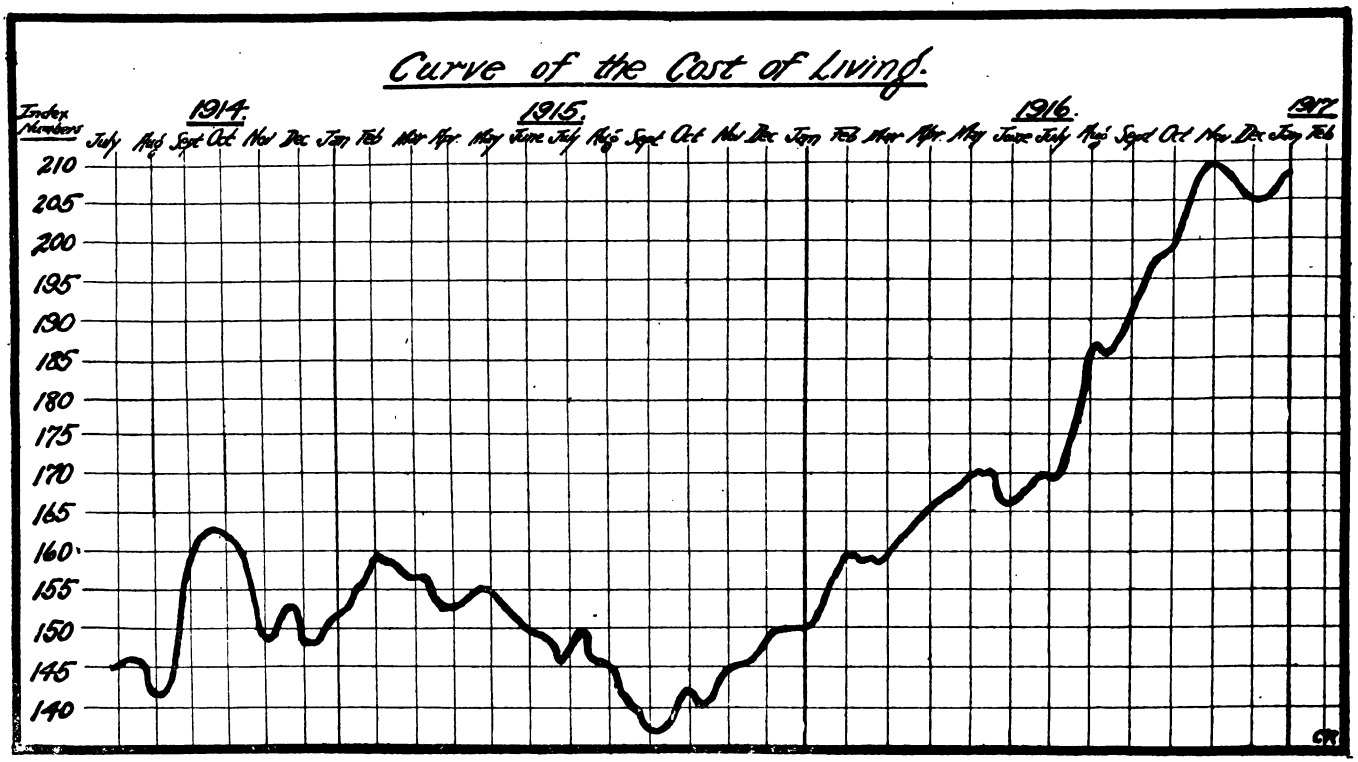

Curve of the Cost of Living.
Index Numbers
1914.
1915.
1916.
1917.
July Aug Sept Oct Nov Dec Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec Jan Feb
210
205
200
195
190
185
180
175
170
165
160
155
150
145
140

CHART 5.

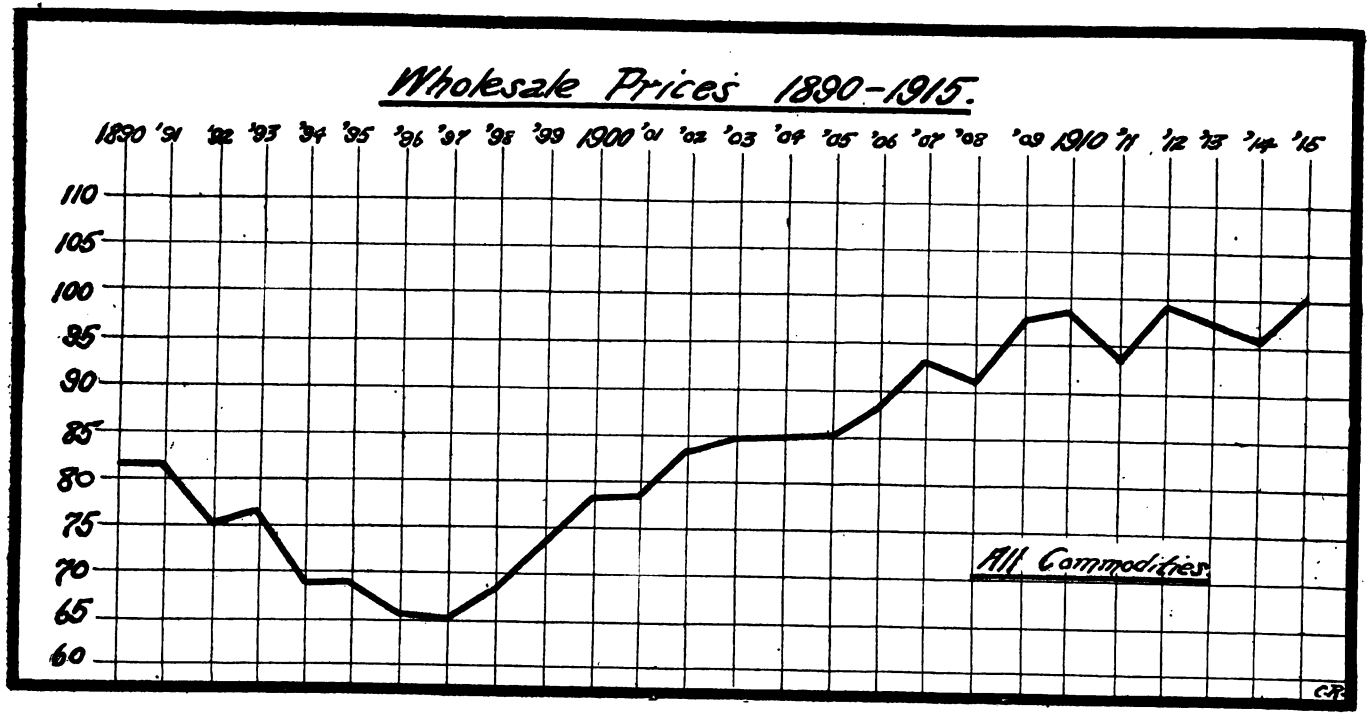

Wholesale Prices 1890-1915.
1890 '91 '92 '93 '94 '95 '96 '97 '98 '99 1900 '01 '02 '03 '04 '05 '06 '07 '08 '09 1910 '11 '12 '13 '14 '15
110
105
100
95
90
85
80
75
70
65
60
All Commodities.

CHART 6

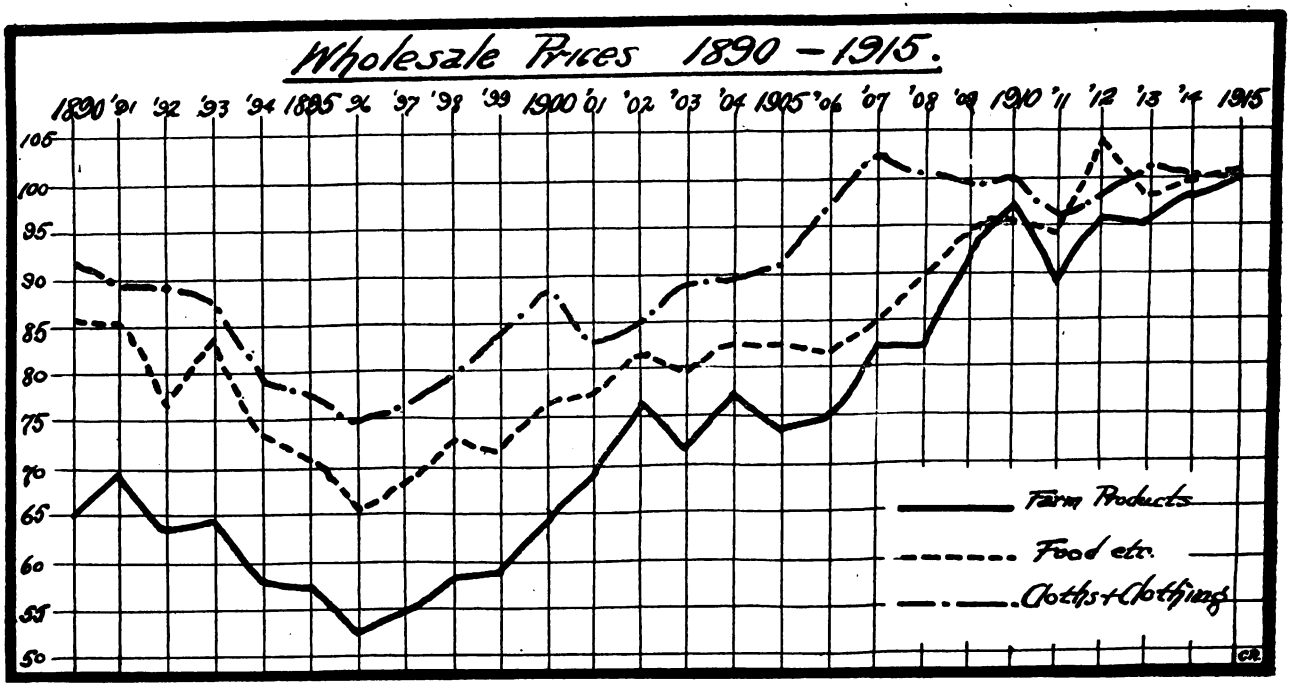

Wholesale Prices 1890 – 1915.
1890 '91 '92 '93 '94 1895 '96 '97 '98 '99 1900 '01 '02 '03 '04 1905 '06 '07 '08 '09 1910 '11 '12 '13 '14 1915
105
100
95
90
85
80
75
70
65
60
55
50
Farm Products
Food etc.
Cloths + Clothing

CHART 7.

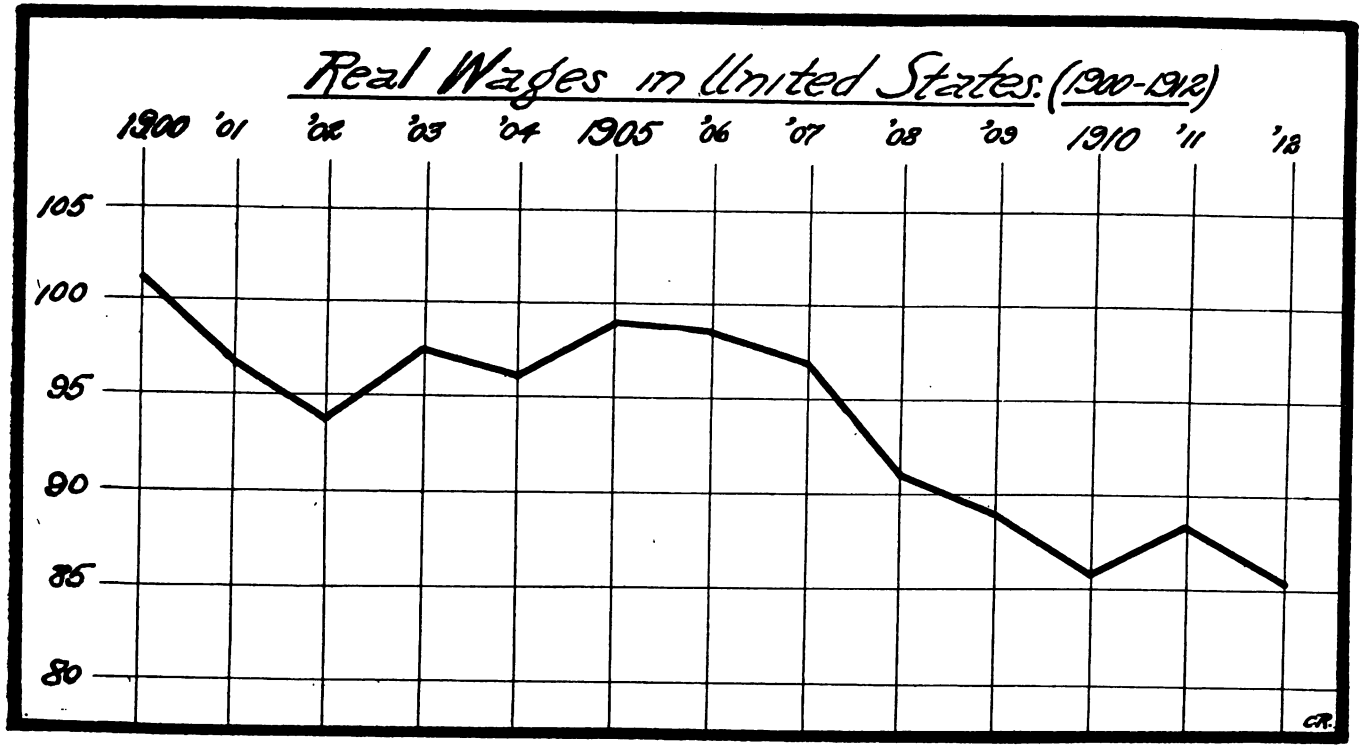

Real Wages in United States. (1900-1912)
1900
'01
'02
'03
'04
1905
'06
'07
'08
'09
1910
'11
'12
105
100
95
90
85
80
CR.

CHART 8.

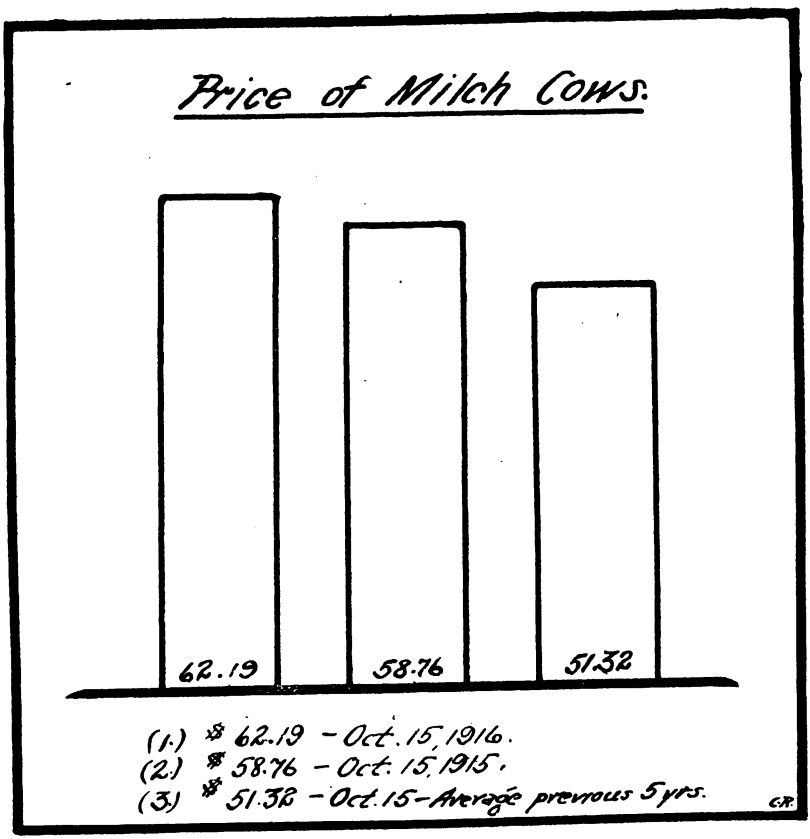

Price of Milch Cows.
62.19
58.76
51.32
(1.) $ 62.19 - Oct. 15, 1916.
(2.) $ 58.76 - Oct. 15, 1915.
(3) $ 51.32 - Oct. 15 - Average previous 5 yrs.
C.R.

CHART 9.

Nov. 15, 1916,	$32 80
Oct. 15, 1916,	29 80
Sept. 15, 1916,	29 20
Aug. 15, 1916,	27 50
July 18, 1916,	27 00
June 15, 1916,	27 30
May 15, 1916,	27 00
Apr. 15, 1916,	26 50
Mar. 15, 1916,	27 50
Feb. 15, 1916,	27 60
Jan. 15, 1916,	27 00
Dec. 15, 1915,	26 80

Monthly Crop Report.
Dept. of Agriculture.

Prepared by Rexford G. Tugwell, University of Pennsylvania.

CHART 10.

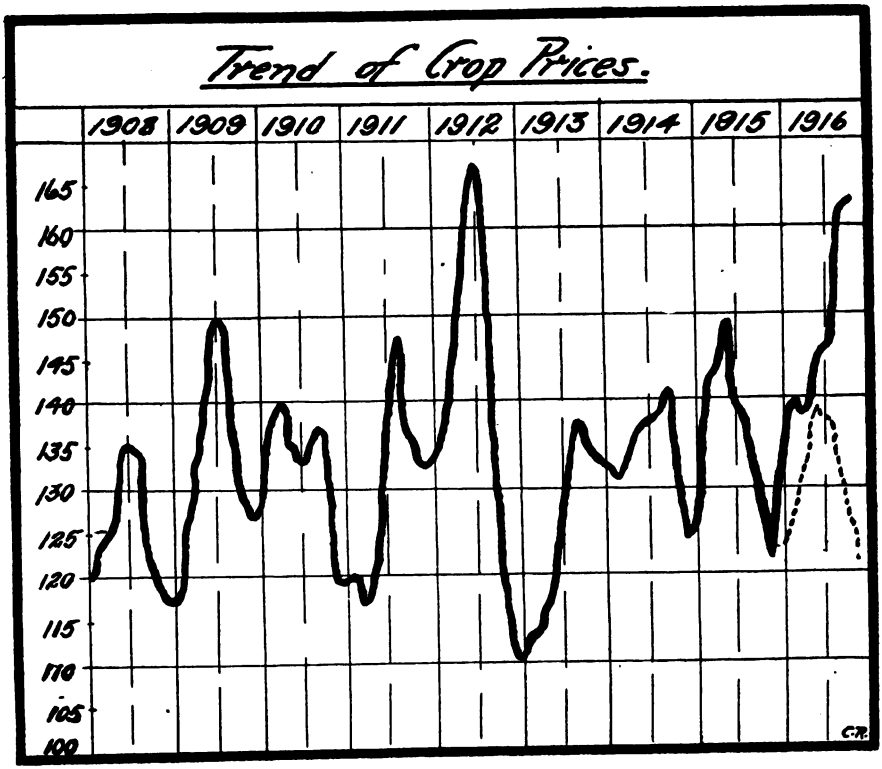

Trend of Crop Prices.
1908
1909
1910
1911
1912
1913
1914
1915
1916
165
160
155
150
145
140
135
130
125
120
115
110
105
100

CHART 11.

rises in prices all along the line. So far as these causes are special, they will probably be remedied. Wages for labor are less likely to go down as labor wages are less susceptible to fluctuations.

Chart No. 1 following shows graphically the increased costs to the farmer from 1900 to September 30, 1916, as reported in the above answers for labor, grain and cows.

The relative proportion of the costs going for feeds, labor, etc., as reported by the farmers is shown graphically in Chart No. 2, while in the Chart No. 3 is pictured the relative importance of the sources of income per cow per year and Chart No. 4 the relative average loss shown by the above answers.

National Factors in Local Milk Costs

The increasing costs as stated above by the farmers of these states are in no sense a local phenomenon. The average monthly wages paid to farm labor in Pennsylvania, Delaware, Maryland and New Jersey increased from $21.81 in 1910 to $24.85 in 1915. The increase in 1916, due to abnormal labor conditions, is no doubt considerably above this average.

Nor has this increase in money wages kept pace with the increase in living costs as shown by the following charts. Chart No. 5 depicts the increase in living costs from July of 1914 to January of 1917 as based on the cost of twenty-five food commodities; Chart No. 6 shows the rise in wholesale prices for all commodities from 1890 to 1915, and Chart No. 7 gives the trend in wholesale prices for farm products for food and for clothing from 1890 to 1915.

Estimated on the basis of these increased costs as compared with the increase in the money wage, the real wage of earners in the United States, as judged by what their money wage will buy, has decreased from 1900 to 1912, as shown in Chart No. 8.

The increase in the price of milk cows of all kinds in Pennsylvania, Delaware, Maryland and New Jersey, is put graphically in Chart No. 9.

The rising price of feeds for cattle during the present year can be pictured by showing the wholesale price of bran in Pennsylvania from December, 1915, to November 15, 1916 as is done in Chart No. 10.

But that this is not the only year when we have had similar increases in the price of farm products is shown by Chart No. 11 giving the trend of all crop prices from 1908 to 1916. The dotted line for the year 1916, it is important to note, indicates where prices would have been had they followed the average trend of the preceding years.

Costs Compared

The Commission has for comparative purposes selected the following answers to the questionnaires as filed with the Commission showing production costs and receipts from herds. These answers were selected because of special evidence of careful records. No 1 is the report of Washington Cadwallader, Bucks county, Pa.; No. 2, of J. E. Stevens, Sudlersville, Md.; No. 3, of D. G. Harry, Pylesville, Harford county, Md.; No. 4, of the 101 farmers of Blair county, Pa.; No. 5, of Francis H. Williamson, Brandywine Summit, Delaware county, Pa.

Production Costs and Receipts from Herds.

Question.	1	2	3	4	5
1. What is the average annual cost per cow to produce milk,	$141 50	$95 00	$117 15	$111 95	[2]$209 87
2. What is the average yearly income per cow from your herd,	126 00	*87 00	[1]137 00	105 30	[3]153 54
3. What is the average yearly output in qts. per cow,	2,920	2,560	2,800	2,355	3,036.6
4. What is the average cost per qt. of milk,	$.0485	$.037	$.041	$.04	$.0573
5. What is the average price you receive per qt. of milk,	.0375	.034	.04	.037	.0385
6. Profit or loss per qt. of milk (loss),	.011	.003	.001	.002	.0188
7. Bl. Breed of cows,	**	†	‡	§	¶

*This is income from milk only. All answers are for year ending Sept. 30, 1916.
**Native cows, preference given to Durhams. †Holsteins and Guernsey. ‡Jersey. §Largely grades. ¶Grade Holsteins.
[1]This is the total of Mr. Harry's income—not a figure given by him.
[2]This is the total of expenses.
[3]This is the total of income.

Professor Fred Rasmussen stated in testimony before the Commission that for a 5,000 pound cow it cost $.0562 per quart to produce milk with the best balanced rations during the month of October, 1916. The details on his estimate are given on the next page.

Following is a comparison of the cost per quart of producing milk as found in stated investigations for given years:

Cost of Production.

Cost per Quart to Produce Milk as Found in Certain Standard Reports by Experiment Stations.

Report.	Year.	Cost per Quart.
Mass. Agr. Experiment Station, Bull. 145.	Sept., 1913,	Average cost, $.0545
Conn. Agri. Experiment Station, Bull. 73.	Average of a grade herd of 124 cows for 5 years, 1907-11.	Actual cost at barn, $.0478
N. J. Experiment Station, 31st Rept.,	Grade herd of 31 selected cows for 1909.	Cost at barn, $.0498
Hoard's Dairyman, Jan. 10, 1903,	For an average of 7,500 lb. cows.	$.0433
New Hampshire Experiment Station, Extension Bulletin 2. State Board of Agriculture, Boston, Mass., Circular No. 8.	1913,	Cow producing 5,540 lbs. of milk per year. $.0492
Cornell University, Bulletin 364,	1912,	Cow producing 4,644 lbs. per year. $.051
	1913,	Cow producing 4,695 lbs. per year. $.044

Cost of Production—Continued

2. Cost as Reported by Certain Civic Organizations

Report.	Year.	Cost per Quart.
Rept. of Women's Civic League on Cost of Milk Prod. in Frederick City, Md., Miss Marlean James, ...	1915, ...	..... $.035
Boston Chamber of Commerce, ...	.....	For cows averaging 5,293 lbs. per year. $.0332
.....	1916, ...	For cows averaging 6,590 lbs. per year. $.0237
		For cows averaging 8,000 lbs. per year. $.0385

The cost of producing milk during the winter of 1916-17 as given before the Commission by Professor Fred Rasmussen, Professor of Dairy Husbandry, State College, Pennsylvania, was as follows:

Professor Rasmussen's Estimate of Present Production Costs

In ascertaining and estimating the cost of producing milk for seven months, October 1, 1916, to May 1, 1917, the actual cost of grain, labor and cattle, as prevailed in Montgomery, Chester, Bucks and Berks counties during October, 1916, has been used. Items for which accurate figures could not be obtained, except through a time study for a year, have been calculated based upon data obtained from Farm Management surveys and cost studies.

Considering that feed, labor and cattle represent 83.9% of the total cost of producing milk, and that these figures have been obtained on the basis of present minimum prices (October, 1916), this is a fair guaranty of the accuracy of 5.62 cents a quart as the minimum price at which milk can be produced in Montgomery, Chester, Bucks and Berks counties during the seven months, October 1, 1916, to May 1, 1917, from a cow producing 5,000 pounds of milk per year. Since these calculations were made, there has been a further increase in the price of and cost of feed for cattle.

Figuring the cost of production on a yearly basis, calculating the cost of pasture and grain for summer feeding, the total cost of keeping a cow per year is $133.93. Crediting the cow with $18.00, the value of the calf and the manure, leaves a balance of $115.93.

The average cost of production for the year of 5,000 pounds, or 2,325 quarts, is 4.98 cents per quart. In this cost, no allowance is made for supervision, profit, or a number of minor factors entering into the cost of producing milk. The farmer has received 16.7 cents per hour for his labor, and has marketed his crops to the cows at farm prices.

Itemized Cost of Producing Milk—5,000 Pounds of Milk per Cow—Prevailing Prices on Feed, Labor and Cattle, October, 1916

	Seven months winter.	Total cost (12 months).	Percentage cost.
DR:			
Feed,	$47 67	$66 83	49.9
Labor,	19 25	33 03	24.6
Cattle,	7 37	12 63	9.4
Buildings,	4 23	7 25	4.4
Delivery,	2 92	5 00	3.7
Bedding,	1 75	3 00	2.2
Ice, coal and wood,	1 04	1 79	1.3
Veterinary services,	51	87	.65
Utensils and supplies,	31	53	.39
Bull,	1 75	3 00	2.2
Cost per cow,	$86 80	$133 93	.....
CR:			
Value of calf,	$1 75	$3 00	.....
Value of manure,	8 75	15 00	.....
	10 50	18 00	.....
Net cost,	76 30	115 93	.....
Production,	1356.6 qt.	2325 qt.	.....
Net cost,	$76 30	$115 93	.....
Cost per quart,	5 62	4 98	.....

In estimating the production for seven months, it is assumed that the production is uniform throughout the year. As this is not likely, calculations were also made on the basis of 40 per cent. greater production during the five summer months than during the seven winter months. The cost in this case proved to be 5.84 cents per quart. The reason for a comparatively high cost of production in winter when summer milk is produced is due to the fact that the overhead charges practically remain the same and that the cow must be maintained during winter months when not producing milk.

Price Received for Milk.

According to the answers received by the Commission from the dairymen,* the average price received per quart of milk was $.037 from 1900 to 1910 and from 1910 to September 30, 1916, the price received was $.036. As the actual profit or loss to the farmers as a result of the price, for the year ending September 30, 1916, the following answers were received: the 101 Blair County farmers report a loss of $.003 per quart; of all others reporting (66 in number) 41 reported a loss of $.01 and 25 a profit of $.008. Counting the 101 Blair County farmers as 101 (making 166 in all) 141 reported a loss

*See page 12.

of $.007 and 25 a profit of $.008. The apparent higher price for the period from 1900 to 1910 was due to differences in including or excluding freight rates and other items. The prices agreed on between the dealers and dairymen in Philadelphia and in Baltimore are as follows:

Philadelphia Prices.

November, 1916, ... $0.06
December, 1916, ... $0.06
January, 1917, ... $0.05½
February, 1917, ... $0.05½
March, 1917, ... $0.05½
April, 1917, ... $0.05½

The prices for Philadelphia, it must be remembered are f. o. b Deducted from this is ½c. per quart for receiving station charges and around ½c. per quart for transportation charges.

Baltimore Prices—Milk Prices per Gallon Based on Quality in Effect November 1, 1916.

Average Butter Fat for Month.	3.5	3.6 3.7 3.8	3.9 4.0 4.1	4.2 4.3 4.4	4.5 4.6 4.7	4.8 4.9 5.0
Nov., 1916,	21	21½	22	22½	23	23½
Dec., 1916,	21	21½	22	22½	23	23½
Jan., 1917,	19	19½	20	20½	21	21½
February, 1917,	19	19½	20	20½	21	21½
March, 1917,	19	19½	20	20½	21	21½
April, 1917,	19	19½	20	20½	21	21½
May, 1917,	17	17½	18	18½	19	19½
June, 1917,	17	17½	18	18½	19	19½
July, 1917,	17	17½	18	18½	19	19½
Aug. 1917,	17	17½	18	18½	19	19½

Surplus Milk. The amount of milk you ship during October, November and December establishes your average shipment. Over and above this "average" is called surplus for which a reduction of not more than 2 cents per gallon may be made.

Milk Account. Many cans are short of holding full quantities, on account of dents or other causes. We give full credit for all the milk we receive.

Butter Fat. The average fat test for the month is made from four to five different day tests. A proportionate amount being drawn from each can according to the size. Before samples are taken the milk is thoroughly mixed. (From the City Dairy Company, of Baltimore.)

Edward W. Woolman's give the following table of prices paid for milk from 1899 to 1916 at "a receiving station within 65 miles of Philadelphia." "The average of three year periods is shown as there have been some fluctuations up and down from year to year, caused by market conditions and by the change from dry to liquid measure in 1907."

Prices Paid by Woolman's, 1899-1916.

Year.	Prices per 100 pounds.	Year.	Prices per 100 pounds.
1899, 1900, 1901,	$1 18½	1908, 1909, 1910,	$1 60
1902, 1903, 1904,	1 35	1911, 1912, 1913,	1 62½
1905, 1906, 1907,	1 47½	1914, 1915, 1916,	1 64½ 1 64½

This shows an increase to the producer of over ½c. per quart without any increase in the retail price from 1901 to the autumn of 1915.

Mr. C. Henderson Supplee gives the following prices "paid at milk stations in Pennsylvania." To this should be added the cost of milk station and freight to get the price f. o. b. Philadelphia.

Prices per 100 Pounds Paid by Supplee, 1900-1916.

Year.	Paid Farmer.	Year.	Paid Farmer.
1900,	$1 28	1909,	$1 59
1903,	1 33	1913,	1 62
1906,	1 42	1916,	1 75

The prices f. o. b. shipping station for the Baltimore market from 1899 to 1916 for three year averages were:

Baltimore Milk Prices, 1899-1916.

Year.	Per Gallon.	Year.	Per Gallon.
1899, 1900, 1901,	$.14	1908, 1909, 1910,	$.14
1902, 1903, 1904,	.13⅜	1911, 1912, 1913,	.14
1905, 1906, 1907,	.13⅜	1914, 1915, 1916,	.16

The following table* give the yearly average market price of milk and butter in the New York market from 1864 to 1915 inclusive.

*Figures taken from The Milk Reporter.

Average Market Price for Milk per Quart, New York City, 1864-1915.

Year.	Milk. Cts.	Butter. Cts.	Year.	Milk. Cts.	Butter. Cts.
1864,	4.83	43.7	1890,	2.63	23.4
1865,	5.88	38.4	1891,	2.66	26.0
1866,	5.35	43.4	1892,	2.68	25.8
1867,	4.8	31.7	1893,	2.79	26.7
1868,	4.75	41.6	1894,	2.63	22.8
1869,	4.83	39.6	1895,	2.52	21.0
1870,	4.6	34	1896,	2.34	18.4
1871,	4.3	31.8	1897,	2.35	18.9
1872,	3.75	28.7	1898,	2.38	19.6
1873,	3.83	33.3	1899,	2.53	21.4
1874,	3.7	37	1900,	2.74	22.4
1875,	3.58	33.2	1901,	2.62	21.6
1876,	3.37	33.2	1902,	2.88	24.8
1877,	3.27	26.8	1903,	2.88	23.48
1878,	2.60	23.3	1904,	2.75	21.75
1879,	2.33	21.3	1905,	2.89	24.64
1880,	2.88	26.4	1906,	3.01	24.67
1881,	2.94	27.5	1907,	3.35	28.14
1882,	3.25	32.5	1908,	3.29	27.0
1883,	3.26	26.3	1909,	3.38	29.21
1884,	3.00	25.8	1910,	3.68	30.13
1885,	2.79	23.0	1911,	3.36	26.77
1886,	2.80	23.5	1912,	3.68	31.38
1887,	2.81	23.5	1913,	3.53	32.23
1888,	2.83	24.4	1914,	3.5	29.89
1889,	2.59	23.7	1915,	3.5	29.82

The Tenant Farmer and the Milk Supply

The tenant farmer is more likely to go on producing milk at low price than is the owner farmer and his supply has a great effect on the total production.

The usual tenant farmer arrangement is for the owner and tenant to furnish equal shares of grain and share alike in the sales from grains. But the tenant farmer has all the hay raised on the farm and gets the proceeds from all the milk. To the owner of the farm this means increasing fertility and hence increasing yields. There are a number of reasons why this arrangement is made but the result is that the tenant farmer feels whether he is wrong or not that his cost to produce milk is lower than those of the man who owns his own farm. The tenant's capital is furnished to him. For his pasture —often one-third of the farm—he pays nothing directly (its rental really being included in the division of grains). But all in all the tenant's overhead expense is little—at least he sees it so—and he will go on producing milk so long as he is repaid for his labor and feeds. This class of farmer produces a considerable portion of the milk used in the cities of the three state co-operating in this investigation. In Delaware for instance the tenant farmer constitutes 55% of the total number of farmers. As reported to the Commission by our special investigator, Mr. Rex Tugwell, about 50% to 60% of the farmers in Western Maryland are tenant farmers. These farms range in size from 60 to 125 acres. Few are larger than this. The

dairy herds are usually above twenty, ranging up to forty or fifty head. Dairies on these farms are growing. This pasture is sometimes one-third of the farm and sometimes, as in sections of Maryland, where 60 per cent. of the farmers are renters, there is a lack of adequate pasture which means that the cows must be barn fed practically during the year, greatly increasing the cost of producing milk.

Maryland.

Farms Operated By—	Per Cent. of Total.							
	Number of farms.		All land in farms.		Improved land in farms.		Value of land and buildings.	
	1910	1900	1910	1900	1910	1900	1910	1900
All farmers,	100	100	100	100	100	100	100	100
Owners,	68.5	64.1	57.4	54.2	56.1	53.7	54.9	55.0
Tenants,	29.5	33.6	38.5	41.9	40.0	42.4	34.9	37.8
Managers,	2.1	2.4	4.1	4.0	3.8	3.8	10.1	7.1

*Pennsylvania.**

Farms Operated By—	Per Cent. of Total.							
	Number of farms.		All land in farms.		Improved land in farms.		Value of land and buildings.	
	1910	1900	1910	1900	1910	1900	1910	1900
Total,	100	100	100	100	100	100	100	100
Owners,	74.9	72.4	69.4	67.5	67.7	65.9	63.7	62.1
Tenants,	23.3	26.0	27.1	29.7	29.4	31.6	30.3	33.4
Managers,	1.8	1.7	3.5	2.8	2.9	2.5	6.0	4.5

**Tenants:* Share + share—Cash, ...13.2% of farmers.
Cash + non-specified, ...10.1% of farmers.

Delaware.

Farms Operated By—	Per Cent. of Total.							
	Number of farms.		All land in farms.		Improved land in farms.		Value of land and buildings.	
	1910	1900	1910	1900	1910	1900	1910	1900
Total,	100	100	100	100	100	100	100	100
Owners,	57.0	48.3	45.9	39.7	45.1	38.1	51.1	41.5
Tenants,	41.9	50.3	52.1	58.7	52.4	60.3	45.5	54.6
Managers,	1.1	1.4	2.0	1.5	2.5	1.6	3.3	3.8

Butter Fat Should Not Be Sole Test in Purchase Price

The Commission feels that it is unfortunate that the butter fat test has been made the sole or primary basis for the purchase of whole or market milk from the farmer. We feel that solids other than fat and the cleanliness of milk should both receive attention in the purchase price as well as butter fat. The grading of milk from the consumer's point of view is emphasized in the report on Grading and Standardization.

Following are tables, taken from the Census of 1910, showing the percentage of tenant farmers for 1900 and 1910, in Maryland, Pennsylvania and Delaware.

Price to the Farmer and the Maintenance of Supply

1. The supply of milk must be permanent and adequate to all community needs. The price, therefore, cannot be allowed to go so low that farmers will be convinced that no profit is to be made from the production of milk. Dairy herds cannot be rehabilitated in a few weeks or in a season.

2. The price for milk cannot permanently go below cost of production; and tendencies in that direction ought to be forseen and forestalled. The price ought to be stabilized by agreements between producer and dealer. The consumer has a direct interest in these agreements. As explained later, this does not mean that this price should be the same in summer and in winter. The dealer's price to the consumer ought also to be a stable one. Temporary losses ought to be equalized in the long run with steady profits. To be sure the price cannot be so high as to compensate fully the inefficient farmer just as the consumer's prices cannot be high enough to keep in business the poor managers among the dealers.

Any danger of shortage of good milk ought to be foreseen and the crisis prepared for before its arrival.

3. In determining the price that dairymen ought to receive or ask the following facts and conditions must be taken into consideration:

(a) The possibility of extension to further fields of supply. An examination of the sources of the supply of milk as given in that part of this report dealing with distribution costs will reveal that the supply of milk for cities in these states—as elsewhere—is coming further and further from the cities.

(b) Those farmers who produce milk as a "side issue" and especially the tenant farmers as described above often feel that they are producing milk at a lower cost than do owner farmers.

(c) Milk will be produced most economically on lands peculiarly fitted for it. Among the factors determining what lands are especially fitted for dairying purposes are: the value of the land; its relative productivity; its usefulness for other purposes; its special adaptation to dairying and the character of the labor supply. Milk cannot be produced most economically on land of high value for trucking or suburban purposes.

When milk is produced and dairy cows kept on high priced land or on land that can be used for money crops, the effect is to bring milk into direct competition with other crops that might be raised on the land and sold for money. If the milk does not bring sufficient return to take its place among the other money crops, it will be dropped from the production list of the farmers. Hence milk raised on land worth $200 an acre other things being equal carries heavier charges than milk produced on land worth $50 an acre. The $50 land on the other hand may be further from the market and its products therefore subject to heavier freight charges or it may be less productive.

The lands in the states cooperating in this investigation that are especially competing in low costs for producing milk are the mountain lands of southern New York and northern Pennsylvania and the lowlands of Delaware, New Jersey, Maryland and Virginia.

How Profits can be Increased by Lowering Costs

The Commission has from the first given careful consideration as to the means by which the cost of producing milk can be lowered and hence the profits to the farmers increased while the total amount consumed will also relatively be increased because of a fair price to the consumer. Among the means of lowering production costs most of which are now being practised by progressive dairymen are the following:—

1. Definite and drastic steps to eliminate "boarders" and increase the yield per cow, per herd and per district.

The following table showing the lower cost of producing milk from good cows was furnished by Ohio State University and is the result of a very careful study of conditions surrounding milk production.

Table Showing Lower Cost of Producing Milk From Good Cows.

Cow producing per year.	Cost per gallon.
3,000 pounds,	27.2c.
4,000 pounds,	20.5c.
5,000 pounds,	16.9c.
6,000 pounds,	14.3c.

This table shows the very great importance of keeping only high producing cows in herds. Of course the butter fat content of the milk should also be considered as well as the quantity of milk produced.

The enlargement of output per cow and per herd and per district will in the following ways tend to lower costs. (a) By adjusting the dairy to the other factors in farm management which has not always been carefully done. (b) By the increased knowledge of the dairy business that would permeate the community once the dairy had a real place on most farms. (c) By the increased savings that would come from the neighborhood uses of bulls, which could then be used to the limit of efficiency in standardized herds and better blood could be secured to sire the growing herds. (d) Cooperative methods of hauling, testing, etc. (e) Increased use of cow testers. (f) The increased use of cost-accounts which would come with the growth of the business and which would serve to show the points at which losses are made and profits earned and hence bring corrective or stimulative measures where needed. (g) Most efficient balance of rations through exchange of results.

It is to be said to the credit of dairymen that they have not attempted through organized effort to curtail product as a means of boosting price. For such an attempt can but react harmfully on the individual and on the district. With the increase of transportation facilities, no one single district (or entire state even) can now hope to have an appreciable influence on the price for milk. If, by farmers' agreements, the price should rise to an abnormal level in any one region, because of curtailed supply, competition from outside districts and states would come in and break the market sending the price down again to a level possibly lower than before. And even if by organization a nation-wide curtailment was brought about competition of other foods would diminish the consumption and hence the demand. Such a movement would be as futile as an attempt on the part of the grain-raisers of a single district to influence the wheat and corn markets of the world. Such movements fail because absolutely contrary to each farmer's own financial interests.

2. Production costs can be lowered through cooperation among the dairy farmers through

(a) Cooperative use of bulls; machinery, etc.

(b) Transmission of experiences freely in meetings and otherwise.

(c) Hauling milk, grain, feeds, etc. A significant example of what farmers can do by cooperation both as to cooperative creameries and with bull associations is the cooperative Grove City Creamery and the cooperative methods adopted by its patrons.

3 Through Cow Testing Associations. This is one of the most satisfactory and inexpensive methods of learning one's herd in a scientific way.

4. Through cooperative action with governmental authorities in maintaining the sanitary standards for milk production outlined in this report in the section dealing with the grading of milk.

Unclean milk should no more be sold in a community than any other dangerous or unclean thing. Unclean milk can never have the confidence of consumers that clean milk will have. It is in the larger use of milk by the city dwellers that the larger demand for milk and hence the larger sales by farmers is to come. Clean milk and stability and growth in the dairy industry go hand in hand.

5. Scientific feeding. Greater attention to the use of the feeds lowers production costs.

6. Keeping accurate cost records. In making up the cost of producing milk home-grown feeds have sometimes been charged at market price and sometimes at cost of raising. Feeds raised ought to be thought of as being marketed through the cow and ought therefore to be charged at the selling prices at the barn. Feeds purchased should also be charged at their cost at the barn. If home-grown feeds are charged only at what they would cost if purchased, costs tend to become uniform throughout the state and country to the extent that wholesale prices of feed are uniform. The Commission especially recommends the system of cost accounting recommended by the National Department of Agriculture.

7. A more extended use of county farm agents.

The Commission in making the statements as to means of lowering production costs has made free use of the testimony of the following witnesses: Mr. Fred Rasmussen, of State College, Pennsylvania; Mr. G. E. Wolcott, Assistant Dairy Husbandman, Bureau of Animal Industry, United States Department of Agriculture, and John N. Rosenberger, Dairy Farm Adviser, Pennsylvania State Department of Agriculture. The condensed statements of Mr. Rasmussen and Mr. Wolcott are hereto appended:

Statement by Fred Rasmussen

How the farmer can decrease the cost of producing milk:

A. Increase production of milk per cow by use of pure bred sires from cows of known production.
   1. As individuals, or by
   2. Cooperative ownership, or by
   3. Forming bull associations.

B. Keeping records of production of the individual cows.
   1. As individuals, or by
   2. Cow-testing associations.

C. Proper feeding and management of cows.
   1. Feed protein and net energy in proportion to weight of cow and amount of milk produced.
   2. Use concentrates which furnish digestible protein and net energy most economically.
   3. Gradually weeding out the largest producers.
   4. Raising calves from highest producing cows.
   5. Good care and sufficient feeding of calves and heifers to assure maximum development.
   6. Raise clover hay and alfalfa where possible.
   7. Provide corn silage for winter months, and where pasture is limited, or has a tendency to dry up, additional silage should be provided for summer months.
   8. Improvement of pastures.

D. Keeping investment in buildings and equipment as low as possible consistent with sanitary requirements and durability.

E. Good management.
   1. Diversified farming, with some cash crop.
   2. Rotation of crops so as to utilize man and horse labor to the greatest advantage, and to assure crops above the average production.
   3. Size of business.

Statement by Mr. G. E. Wolcott

"Complying with your request of Monday, November 20th, I am suggesting briefly some practices of dairy farming, which in my opinion should materially increase the profit from the dairy herds in Maryland.

"First.—All unprofitable cows should be eliminated from the herd by an adequate system of yearly records which will show the value of the product, and the cost of the feed. There are some hundred and fifty herds in Maryland which by taking advantage of the records of cow testing associations have increased their average production, in

some cases, a thousand pounds of milk per year. The records of these associations have been used as a basis for calculating the cost of producing milk in data submitted to the Commission. Where no system of records has been kept the returns are doubtful.

"Second.—A system of feeding should be followed which allows each cow in the herd the amount of feed which is necessary for her most economical production. Within a certain limit, a large production is also an economical production. Liberal but careful feeding should be the rule.

"Third.—More protein roughage such as alfalfa, clover and soy bean hay should be grown on the farm. Such crops furnish hay which is palatable and the high protein content obviates the necessity of purchasing large amounts of high priced concentrates. Legume hay, corn silage, corn meal—all grown on the farm—furnish a large proportion of the nutrients needed for the average production and reduce the amount of by-product feeds, necessary to complete the rations, to the minimum.

"Fourth.—The practice of buying cows from dealers should be discouraged. The value of such cows as producers is questionable. Furthermore, disease is liable to be introduced when animals of unknown ownership are purchased.

The better way of supplying animals to take the place of discarded ones is to raise the heifer calves that are dropped by the best cows in the herd. The herd bull should be a pure bred whose near ancestors have records averaging 400 pounds of butter fat per year or more.

"Fifth.—The feeds that are purchased to supplement those grown on the farm should be ordered in July or August or when the price is lowest. The present prices of cottonseed meal, bran and other by-product feeds is fully 25 per cent. higher than the prices quoted last summer. Ordinarily the difference in price will not be so great; but several dollars per ton can be saved in a normal year by calculating the amount needed and placing the order early.

"Sixth.—The highest grade of milk should be the aim of the dairymen. This is not only more profitable, but will also stimulate the consumption thereby increasing the demand."

UNIV. OF CALIFORNIA

DISTRIBUTION

(Including Transportation and Sources of Supply)

COMMITTEE IN CHARGE: Morris T. Phillips, Pennsylvania, *Chairman;* C. Henderson Supplee, Pennsylvania; Clyde L. King, Pennsylvania; Hartman K. Harrison, Maryland; Harry Hayward, Delaware.

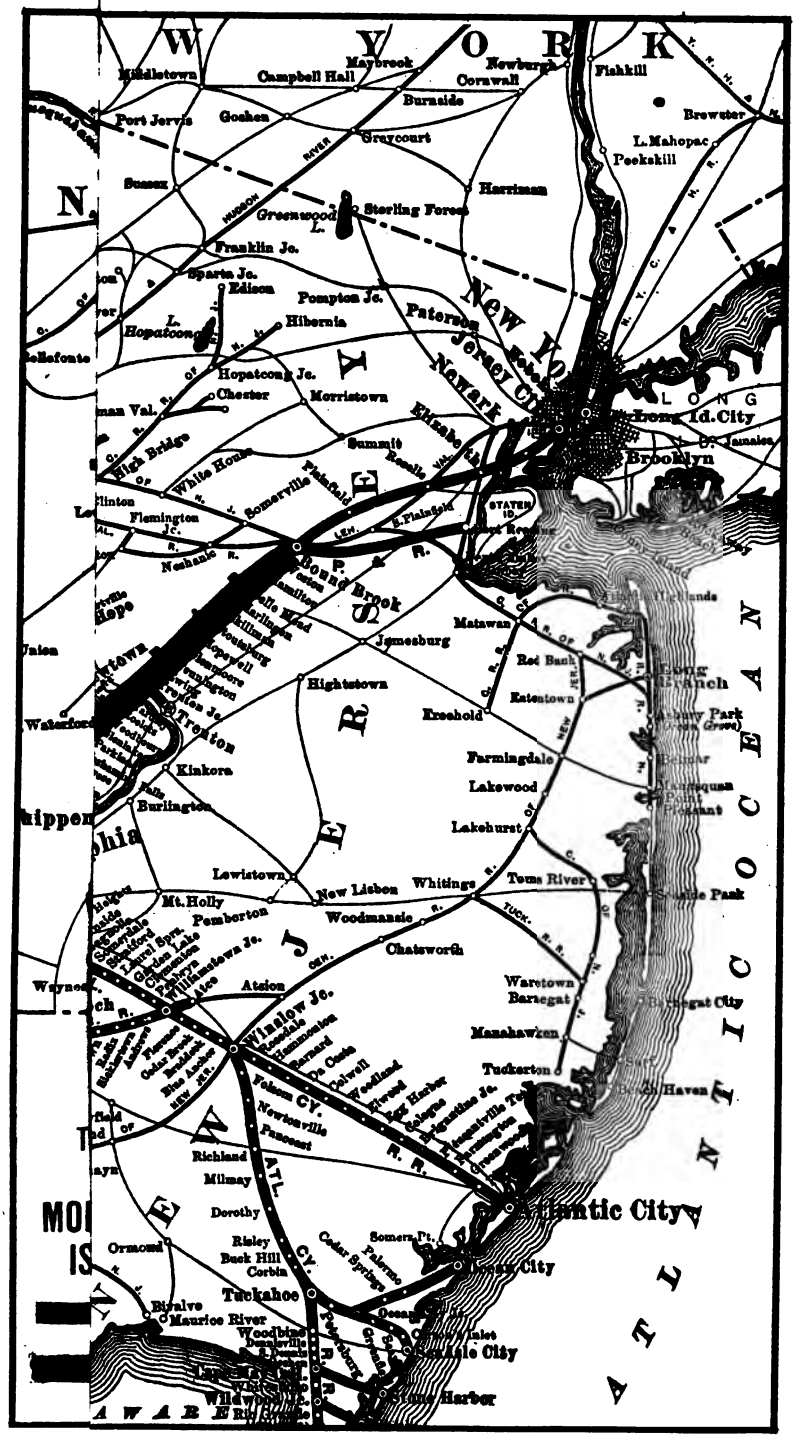
The sources for the milk supply of a modern city are exemplified by the following maps and tables giving the portion of milk received in Philadelphia, Baltimore, Chester, Wilmington, New York City and Trenton through one or more of the main transportation facilities.

The map of the Pennsylvania Railroad shows (A) the zones for shipping rates on milk and (B) the points from which milk is shipped (1) to New York City exclusively, (2) to Philadelphia exclusively, (3) to both New York and Philadelphia and (4) to other points. The distance of the milk supply and the competition of all cities for the same milk are the important facts brought out. Indeed it can well be said that New York City, Trenton, Philadelphia, Wilmington, Baltimore and the coast cities get their milk supply from practically the same territory.

Map No. 1 of the Reading shows the territory served by the Morning or Pick Up Train Service on that line. The geographical limits within which such service may be operated is controlled by two conditions. The first is that many buyers will want the milk to reach Philadelphia sufficiently early in the morning to permit use or delivery to householders the same day. Experience has demonstrated that the latest time of arrival of the milk trains at the delivery stations here must be 9 A. M., and the four Reading morning trains are so scheduled. Working back from this fixed arriving time, the range of territory served by these trains is obviously determined by the ability of the shippers to get their milk to the country loading platforms to meet the trains, and here again experience shows that about five o'clock in the morning is the earliest hour that can be fixed for the departure of the trains from their initial stations. In other words morning trains can be operated for the mutual requirements of shippers and receivers only within a period of about four hours (5 A. M. to 9 A. M.), the effect of which is that milk supply for the city, moving by morning service, must be drawn from nearby producing points—a maximum distance, say, of 80 miles. The most remote point from which milk is carried by this morning service is 77 miles from Philadelphia, and the nearest 23 miles, but most of the traffic originates at stations 30 to 60 miles distant.

In general it may be said that the morning trains serve the farmers who ship direct to their Philadelphia customers, the latter being the smaller city dealers. This service places a large number of individual producers in direct business relations with individual receivers. One feature of this morning service which is particularly interesting is the extraordinary number of shippers using it and the varied sizes of cans or containers employed. On the morning of May 8, 1916, there were 767 shippers who sent their milk to Philadelphia and the total number of cans carried was 2,603, an average of 3 4-10 cans per shipper. The 30 quart can predominates in this service. This tabulation does not include the milk from the Wilmington and Northern Branch moving to Twenty-fourth and Chestnut streets, Philadelphia. It would be conservative to estimate the daily morning shippers on that branch as from 100 to 125.

The transportation of milk in the morning trains being limited to this comparatively small area, it becomes necessary to provide the so-called "night" milk trains, which, as a matter of fact, leave the departure points in the afternoon, arriving at Philadelphia shortly before midnight. The territory having this night service is shown on Reading Map No. 2. All of the milk carried by the night trains comes from "milk-shipping stations" or centralizing plants operated by commercial organizations (chiefly large Philadelphia dealers) which buy the milk from the farmers and prepare it for market before shipment. There are practically no shipments of milk carried on the night trains moving direct from farmers to their city customers. There are various reasons for this, apart from the cause just cited, one being that the farmers could not conveniently interrupt their general work to team the milk during the middle of the day to the railroad station. Thus one Philadelphia shipper shipped, on the night service during the year ended December 31, 1915, from a station about 50 miles from that city, 436,114 quarts of milk and 10,810 quarts of cream, shipping on one day in May of 1916, 2,300 quarts of milk and 46 quarts of cream. From three points about 40, 45 and 50 miles, respectively, from Philadelphia, two shippers during this year (ending December 31, 1915) shipped 2,712,464 quarts of milk and 53,654 quarts of cream to Philadelphia and on one day in May of 1916 sent in 7,310 quarts of milk and 1,440 quarts of cream. Two shippers during the year ended December 31, 1915, sent in, by night service, from two points about 60 miles from Philadelphia, 2,141,126 quarts of milk and 92,068 quarts of cream, and on one day in May of 1916, 4,002 quarts of milk and 320 quarts of cream. During the year ended December 31, 1915, one shipper shipped to Philadelphia, from a station about 35 miles distant, by afternoon service, 516,200 quarts of milk and 63,960 quarts of cream, and on one day 1,400 quarts of milk and 440 quarts of cream.


NEW YORK
Middletown
Campbell Hall
Maybrook
Newburgh
Cornwall
Fishkill
Port Jervis
Goshen
Burnside
Brewster
Graycourt
L. Mahopac
Peekskill
Sussex
Harriman
Greenwood L.
Sterling Forest
Franklin Jc.
Sparta Jc.
Edison
Pompton Jc.
Paterson
Jersey City
Newark
Hopatcong L.
Hibernia
Hopatcong Jc.
Chester
Morristown
Elizabeth
Long Id. City
Brooklyn
High Bridge
White House
Somerville
Plainfield
Summit
Roselle
S. Plainfield
Flemington
Flemington Jc.
Neshanic
Bound Brook
Jamesburg
Matawan
Red Bank
Long Branch
Hightstown
Freehold
Eatontown
Asbury Park
Trenton
Farmingdale
Kinkora
Lakewood
Burlington
Lakehurst
Lewistown
New Lisbon
Whitings
Toms River
Mt. Holly
Pemberton
Woodmansie
Chatsworth
Atsion
Winslow Jc.
Waretown
Barnegat
Manahawken
Tuckerton
Richland
Millway
Dorothy
Atlantic City
Ormond
Risley
Buck Hill
Corbin
Somers Pt.
Ocean City
Tuckahoe
Beesley's Point
Bivalve
Maurice River
Woodbine
Ocean City
Wildwood
Stone Harbor
NEW JERSEY
ATLANTIC OCEAN
DELAWARE BAY

Following is a table showing the amount of milk and cream shipped into Philadelphia over the various branches of the Philadelphia and Reading Railway.

Quantity of Milk and Cream Traffic Originating on Philadelphia & Reading Railway During Year Ending December 31st, 1915, for Philadelphia.[3]

From—	Milk. Quarts.	Cream.[4] Quarts.
Main Line,	1,445,694	10,810
Phila. & Chester Valley R. R.,	2,450,000	.....
Pickering Valley R. R.,	5,004,304	53,654
Colebrookdale Branch,	3,268,616	92,068
Perkiomen R. R.,	6,114,062	.....
New York Branch,	3,647,130	.....
Phila. & Newton & New York R. R.,	2,144,460	.....
Bethlehem Branch,	3,034,310	.....
North East Pennsylvania R. R.,	3,862,240	63,960
Doylestown Branch,	1,589,070	.....
Stony Creek R. R.,	469,810	.....
Wilmington & Northern R. R. (Note 1),	5,364,426	103,718
Wilmington & Northern R. R. (Note 2),	4,734,340	.....
Beyond Reading, Penna.,	12,024,196	366,858
Total,	55,152,658	691,068

Note (1) Intrastate via Birdsboro, Pa.
(2) Interstate via Elsmere Junction, Del.
(3) Furnished by the courtesy of the Reading R. R. Co.
(4) Data as to cream shipments have been shown only when available. In some instances the movement of cream is not segregated from the milk.

It is to be noted from this table that twelve of the fifty-five million quarts of milk and three hundred and sixty-six of the six hundred and ninety-one thousand quarts of cream shipped over the Reading Railroad came from points beyond Reading, Pa. The milk carried by the night trains is collected from as far distant as Gettysburg, Pa., (172 miles) and as near as Kimberton, Pa., (41 miles). In general the night trains serve the territory not reached by the morning trains.*

These facts are typical of the morning and night train service furnished by the Pennsylvania Railroad and other lines.

The following table gives the milk shipments received at Philadelphia, Pa., Darby, Pa., Chester, Pa. and Wilmington, Del., from January 1, 1916 to January 1, 1917, inclusive, over the Baltimore and Ohio Railroad Company:

*But there are a few instances south of Reading, Pa., where the two services overlap, there being both morning and night movements (for example from the Colebrookdale and Pickering Valley Branches). On the Wilmington & Northern Branch, (between Birdsboro, Pa., and Wilmington, Del.) two distinct services are operated to Philadelphia, moving in opposite directions. One is the morning train which travels southward collecting milk for Philadelphia at many points in Chester County, and at some few stations in the State of Delaware. This train moves over the Baltimore and Ohio Railroad from Wilmington, the milk being delivered at 24th & Chestnut Streets Station, in this city. Practically all of the milk carried by this train is shipped direct by farmers, and goes to dealers in South Philadelphia and West Philadelphia. The second or night train operates in the reverse direction, moving northward from Wilmington, Del., and handling milk from several Chester County "milk-shipping stations." These cars are taken to Birdsboro and thence move to Philadelphia via the Main Line, delivery being made to consignees either at 12th & Willow Streets or at Second & Berks Streets as desired.

Number of Gallons Received by Months—Baltimore and Ohio—1916.

Months.	Philadelphia.	Darby.	Chester.	Wilmington.
January,	231,404	4,255	2,360	725
February,	222,814	3,810	2,145	570
March,	253,291	4,155	1,945	3,394
April,	383,941	4,261	1,755	2,945
May,	226,514	5,004	1,915	3,984
June,	367,265	4,346	1,605	3,499
July,	299,622	3,545	2,832	2,948
August,	285,745	3,332	5,237	3,044
September,	245,977	3,356	4,771	2,807
October,	212,460	3,809	5,709	4,630
November,	193,412	3,480	5,535	5,054
December,	201,497	4,764	5,315	4,476
Total,	3,083,942	48,117	41,124	38,072

The milk shipments for one day in June, 1915 and one day in November, 1916 based on first 15 days of each month received over the lines of The Philadelphia Rapid Transit Company were as follows:

Milk Received Over P. R. T. Lines.

Received at	June 1916 Quarts.	November 1916 Quarts.
Doylestown—P. & E. Interline Milk received by P. & M. at various points from Ziegeleville to Doylestown,	146,867	138,800
*Doylestown to Edison,	189,000	207,200
*Edison to Warrington,	134,800	89,200
*Warrington to Neshaminy,	203,000	180,667
*Neshaminy to Hallowell,	118,467	79,122
*Howell to Willow Grove,	103,133	65,067
*Hatboro to Willow Grove,	2,733	.....
*Willow Grove to Phila.,	.....	.....
	751,133	821,667
Total,	898,000	760,467

*From and including First Station to Second Station not inclusive. Auditor's office, 12, 13, 16.

The following table compares the sources over which Philadelphia got its milk supply for 1913 and 1916. A comparison of these totals reveals, in connection with the preceding maps, the ever increasing distance from which the city's milk supply comes:

Sources of Philadelphia Milk Supply 1915 and 1903

Source.	1915 Total.	%	1903 Total.	%
Penna. R. R.,	93,675,462	52.5	47,984,000	43.2
Phila. & R. R. R.,	53,938,435	30.2	38,842,000	35.1
B. & O.,	11,907,916	6.6	7,015,000	6.3
Auto trucks and wagons,	4,800,000	2.6	7,200,000	6.3
Lehigh Valley,	.....	.....	*10,201,000	9.0
63rd St. trolley,	3,832,931	2.1	.....	.....
16th & Huntingdon,	3,282,674	1.8	.....	.....
Adams Express,	6,234,400	3.4	.....	.....
Wells Fargo,	150,120	.08	.....	.....
American Express,	606,960	.34	.....	.....

*All diverted to New York City since 1903.

Milk Supply Zones, Showing Quantities produced (Quarts) and Transported to Philadelphia, June 1st, 1916.

	10 Miles.	10-20	20-30	30-40	40-50	50-70	70-100	Over 100	Total.	Per Cent.
Penna. R. R.,	490	3,370	37,600	36,800	43,270	50,390	28,440	55,860	256,220	47.92
P. & R. R. R.,	.....	2,460	4,920	31,270	44,440	30,900	21,340	19,570	154,900	28.97
B. & O. R. R.,	.....	1,200	.....	3,200	31,000	3,200	.....	200	38,800	7.25
Wagons,	15,000	10,000	.....	.....	.....	.....	.....	.....	25,000	4.67
Auto trucks,	7,150	7,000	10,000	.....	.....	.....	.....	.....	24,150	4.51
Adams Exp.,	.....	.....	1,000	5,000	2,000	2,000	3,000	2,000	15,000	2.80
West Chester,	1,220	8,880	.....	.....	.....	.....	.....	.....	10,100	1.89
P. & E. E. R. R.,	400	900	5,730	2,290	.....	.....	.....	.....	9,320	1.74
Wells Fargo,	.....	1,200	.....	.....	.....	.....	.....	.....	1,200	.22
Total,	24,260	35,010	59,250	78,560	120,710	86,490	52,780	77,630	534,690	.....
Per cent. by zones,	4.53	5.56	11.08	14.69	22.57	16.17	9.87	14.51	.....	.....

Fifty per cent. (48.6%) of Philadelphia's milk supply now comes from a distance of fifty miles or over, and 63 per cent. from forty miles or over.

The tendency of dairies to develop at points of ever increasing distance from the cities they serve is further shown on the table on page 33, indicating the distances from which Philadelphia's Milk Supply is drawn.

Wilmington's Milk Supply

Wilmington receives daily 25,500 quarts of milk, 25% of which is brought into the city by producers in their own conveyances. The average haul of the remainder (75%), brought by rail and motor truck, is about twenty miles. The railroads hauling milk to Wilmington are the Baltimore and Ohio, the Pennsylvania and the Philadelphia and Reading.

Baltimore's Milk Supply

Baltimore secures practically all of its supply from five counties in Maryland: Baltimore, Carroll, Howard and Frederick. Practically all of its milk is transported fifty miles or less. The railroads furnishing this service are the Pennsylvania System, the Baltimore and Ohio, Maryland and Pennsylvania and Western Maryland; also auto truck lines and wagons. The total quantity of milk received daily is (approximately) 126,000 quarts. There are no night milk trains.

The Cost of Transportation

An examination of the tables given below will show that the cost of transporting milk as exemplified in the rates to the city of Philadelphia is a very material item in the cost of milk to the consumer and in the price that can be paid to the farmer.

Table of Rates to Philadelphia on Milk and Similar Commodities.

(Taken from Pennsylvania Railroad Tariff M. & C.—I. C. C. No. 1., M. & C.—P. S. C. Pa. No. 1 and subject to all the rules and regulations therein contained. (C. L., of course, means carload; L. C. L. less than carload.)

Description of Containers. (Containers of other capacity than specified below will be rated at next higher capacity.)	1st Zone. 30 miles or under.		2d Zone. 31 to 65 miles.		3d Zone. 66 to 100 miles.		4th Zone. 101 to 190 miles.		5th Zone. 191 to 500 miles.		6th Zone. Over 500 miles.	
	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.
Rates in Cents per Can and per Case on Milk, Skimmed Milk, Buttermilk and per Can on Pot Cheese. (Liquid Measure.)					A	A	A	A	A	A	A	A
Cans, 20 quarts capacity,	10	8.7	11.5	10	13.7	11.9	15.2	13.2	16.8	14.6	18.4	16
Cans, 23 quarts capacity,	11.5	10	13.3	11.5	15.8	13.7	17.5	15.2	19.3	16.8	21.2	18.4
Cans, 24 quarts capacity,	12	10.4	13.8	12	16.4	14.3	18.3	15.9	20.2	17.5	22.1	19.2
Cans, 30 quarts capacity,	15	13	17.3	15	20.5	17.9	22.9	19.9	25.2	22	27.6	23.9
Cans, 40 quarts capacity,	20	17.4	23	20	27.3	23.7	30.5	26.5	33.6	29.2	36.8	31.9
Cans, 46 quarts capacity,	23	20	26.5	23	31.4	27.3	35.1	30.5	38.6	33.6	42.3	36.8
Cases, 12 quarts capacity,	8.4	7.3	9.7	8.4	11.4	10	12.8	11.1	14.1	12.3	15.4	13.4
Cases, 15 quarts capacity,	10.5	9.1	12.1	10.5	14.4	12.5	16	13.9	17.6	15.3	19.3	16.8
Cases, 20 quarts capacity,	14	12.2	16.1	14	18.1	16.6	21.3	18.5	23.5	20.5	25.7	22.4
Cases, 20 pints capacity,	8	7	9.2	8	10.9	9.5	12.2	10.5	13.4	11.7	14.7	12.8
Cases, 24 pints capacity,	9.6	8.4	11	9.6	13	11.3	14.7	12.8	16.2	14.1	17.6	15.3

A Advance.

Table of rates to Philadelphia on Cream and Condensed Milk.

(Taken from Pennsylvania Railroad Tariff M. & C.—I. C. C. No. 1., M. & C.—P. S. C. Pa. No. 1 and subject to all the rules and regulations therein contained.)

Description of Containers. (Containers of other capacity than specified below will be rated at next higher capacity.)	1st Zone. 30 miles or under.		2d Zone. 31 to 65 miles.		3d Zone. 66 to 100 miles.		4th Zone. 101 to 190 miles.		5th Zone. 191 to 500 miles.		6th Zone. Over 500 miles.	
	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	C. L.
Rates in Cents per Can and per Case on Cream and Condensed Milk.					A	A	A	A	A	A	A	A
(Liquid Measure.)												
Cans, 20 quarts capacity,	17.5	....	20.5	....	23.1	....	24.7	....	26.3	....	27.8	....
Cans, 23 quarts capacity,	20.2	....	23.5	....	26.6	....	28.5	....	30.2	....	32	....
Cans, 40 quarts capacity,	35	....	41	....	46.2	....	49.4	....	52.5	....	55.7	....
Cans, 46 quarts capacity,	40.3	....	47.2	....	53.1	....	56.8	....	60.4	....	64	....
Cases, 12 quarts capacity,	14.7	....	17.2	....	19.4	....	20.7	....	22.1	....	23.4	....
Cases, 15 quarts capacity,	18.4	....	21.5	....	24.3	....	25.9	....	27.6	....	29.2	....
Cases, 20 quarts capacity,	24.5	....	28.7	....	32.3	....	34.5	....	36.8	....	39	....
Cases, 20 pints capacity,	10	....	16.4	....	18.5	....	19.7	....	21	....	22.3	....
Cases, 24 pints capacity,	16.8	....	19.7	....	22.2	....	23.7	....	25.2	....	26.7	....
Cases, 40 half pints capacity,	15.8	....	18.5	....	20.8	....	22.3	....	23.6	....	25.1	....
Cases, 48 half pints capacity,	18.9	....	22.1	....	25	....	26.7	....	28.4	....	30	....
*Cases, 96 quarter pint capacity,	21	....	24.6	....	27.7	....	29.6	....	31.5	....	33.4	....

*New rates. A Advance.

The Philadelphia Milk Exchange has brought a case before the Interstate Commerce Commission and also before the Pennsylvania Public Service Commission urging the lowering of these rates. The rates proposed by the Milk Exchange are as follows:

Rates Proposed by Philadelphia Milk Exchange at the Hearing Before the Interstate Commerce Commission at Washington, Oct. 27, 1916. Proposed Rates in cents on Milk and Cream per 40-quart can to Philadelphia and suburban stations and to Lower New Jersey Seashore Resorts.

Zones (Miles).	Milk & C.		Cream, Condensed Milk & C.	
	L.C.L.	C.L.	L.C.L.	C.L.
1 to 20,	11.4	Rates to be 87½% of L.C.L. rates.	Rates to be 25% over L.C.L milk rates.	Rates to be 25% over C.L. milk rates.
21 to 40,	13.9			
41 to 60,	16.1			
61 to 80,	18.0			
81 to 100,	19.7			
101 to 120,	21.3			
121 to 140,	22.8			
141 to 180,	24.0			
181 to 220,	25.0			
221 to 260,	26.0			
261 to 340,	27.0			
341 to 420,	28.0			
421 to 500,	29.0			

And so on, adding one cent for each 80 miles. Notes:—

1. L. C. L. rates to include refrigeration.
2. Rates for united movements in freight cars in freight trains not to exceed 75 er cent. of rates on milk, passenger or express to trains.
3. Carload minimum milk, cream or condensed milk to be 4,000 quarts. Mixed carloads to be charged carload rates on each commodity for the actual number of cans carried.
4. Rates on 46 quart can to be 112½ per cent. of the 40-quart can.
5. Rates on bottled milk and cream in cases to be established upon the basis of 120 per cent. of the rates on the same commodities in cans.
6. Actual (not constructive) short line mileage to be used in ascertaining distances.

It will be noted that the difference between the rates in force and the rates proposed by the milk dealers is a very significant decrease in cost. If milk rates to the farmers are to be on the basis of f. o. b. Philadelphia or other metropolitan centers, such as Baltimore or Wilmington, the question of freight rates becomes a question of deep interest and concern to the dairymen.

As this matter is now before the Interstate Commerce Commission for interstate rates and the Pennsylvania Public Service Commission for intra-state rates and has been thoroughly and capably presented for both sides in briefs now of public record, the Commission decided it was not advisable to make a separate investigation and therefore makes no special recommendation on this point. It does, however, wish to emphasize the importance of these rates to the dairyman, the dealer and the consumer.

The Commission also wishes to point out the relation of the zone system of rates upon points of milk production. An examination

of the above table giving existing rates will show that the present zones are practically thirty mile zones up to 100 miles; then follow zones of 90 and 310 miles respectively and finally a zone of any distance over 500 miles.

In the rates proposed by the dealers the zones are twenty miles each up to 140 miles, then forty miles each up to 260 miles, then 80 miles each up to 500 miles—a proportionate increase in rates for each zone.

This is another way of saying that places at present 500 miles from Philadelphia have a rate of but 11 cents per 40 quart can more than nearby places and that all places within the same zone are equi-distant from Philadelphia so far as costs of transportation are concerned. The zone system is, we realize, the only feasible system for milk rates. But its effect on competition of distant sources of supply with nearby sources of supply is far reaching and significant. It also tends to specialize the milk producing industry in those territories peculiarly suited to milk production.

The Cost of Distribution

Your Commission sent out to all milk dealers in the larger cities of the three states represented in this inquiry questionnaires asking for detailed statements as to the cost elements in distributing milk. A copy of this questionnaire is given in the appended footnote.[1] Certain of these dealers placed the accounting firm of Haskins & Sells or other equally competent expert accountants on their books. The results of five of the Philadelphia dealers whose books were also thus gone over are given by numbers and not by name. In each case definite assurance has been given that these costs are accurate. The results as filed with the commission are as follows:

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*THE GOVERNORS' TRI-STATE MILK COMMISSION. Information Desired by the Committee on Distribution Costs for year ending September 30, 1916:

1. How many quarts of milk did you handle?
2. (a) What was your loss by evaporation? (b) What was your loss by bottling? (c) What was your loss by handling?
3. How many quarts of milk did you sell wholesale?
4. How many quarts of milk did you sell retail?
5. How many quarts of milk did you handle as surplus?
6. What is the average selling price of your surplus per quart?
7. What was your average selling price per quart?
8. What was your (per quart) wholesale price? Retail price? Surplus price?
9. What is your total distribution cost?
10. What is it made up of? (a) Creamery expenses as follows: 1. Wages, 2. Refrigeration, 3. Carting, 4. Depreciation. (b) Pasteurizing and bottling expenses: 1. Wages, 2. Refrigeration, 3. Glass bottles and breakage, 4. Bottle boxes, 5. Interest on investment. (c) Route expense: 1. Delivery, advertising, 2. Wages, 3. Loss of bottles, 4. Ice. (d) Stable expense: 1. Feeding of horses, 2. Maintenance of Wagons and harness, 3. Wages, 4. Motor trucks. (e) Office expense: 1. Wages, 2. Stationery.
11. How much milk do you deliver per wagon per day?
12. Would there be an economy in the elimination of some wagons by eliminating duplication in delivery routes? If so, how could this elimination be brought about?

Cost Items in Milk Distribution.

Name.	City—State.	No. of qts. handled, 1916.	Loss by—			Quarts Sold.			Average price of surplus per qt.	Av. selling price per qt.
			Evaporation.	Bottling.	Handling.	Wholesale.	Retail.	Handled as surplus.		
Abbott's Alderney Dairies, ...	Phila., Pa., ...	16,067,676	1%	½%	½%	738,548	14,464,898	542,800	.0241	.1003
S. Shapiro, ...	Phila., Pa., ...	307,800	1,232 quarts	.....	200	199,800	108,000	None	.....	.065
S. Shechter, ...	Baltimore, Md.,	1,000 day 360,000	12 day 4,320	8 day 2,880	4 day 1,440	500 day 180,000	500 day 180,000	None	.....	.08
Essex Farm Dairy Co., ...	Lotherville, Md.	172,800	Not available	.....	.....	28,800	115,200	57,600	.06	.08
Phila. Dealer No. I, ...	Phila., Pa., ...	15,000,000	5% to 7%	.....	.....	4,050,000	10,950,000	Do not know	Cannot tell	.068
Phila. Dealer No. II, ...	Phila., Pa., ...	11,996,151								.0793
Phila. Dealer No. III, ...	Phila., Pa., ...	27,675,632	3%	.....	.....	1,092,744	13,824,030	3,891,584	No record	.0785
Phila. Dealer No. IV, ...	Phila., Pa., ...	9,641,918	159,971			595,825	7,008,219	1,875,735	.058573	.073575
Phila. Dealer No. V, ...	Phila., Pa., ...	3,283,438	3%	.....	.....	1,189,265	2,094,173	1,398,917	.002 skim milk 30 lb. butter	Impossible to determine
City Dairy Co., Gardiner Branch, ...	Baltimore, Md.,	6,839,900	136,796	68,396	60,536	1,191,984	4,835,048	547,140		.0852

Note: Dotted lines indicate that the figure pertains to all the items covered by the dotted lines. Thus, $.015 per quart in the figures of Mr. Schechter (page 41), of Baltimore, include pasteurizing and bottling expenses, route expense, stable expense, office expense.

Cost Items in Milk Distribution.—Continued.

Name.	City—State.	Your Price.			Receiving Station or Creamery Expenses.				Pasteurizing.	
		Wholesale.	Retail.	Surplus.	Wages.	Refrigeration.	Carting.	Depreciation.	Wages.	Refrigeration.
Abbott's Alderney Dairies,	Phila., Pa.,	.06[illegible]	.08 .10 .12 .18	.0241	$12,591 31 .00082	$16,287 93 .001	.0004 $6,549 56 $40,538 97 (freight)	$4,437 21 .00029	$66,847 61 .0044	$65,513 87 .0043
S. Shapiro,	Phila., Pa.,	.055-.06	.08							
S. Shechter,	Baltimore, Md.,	.07	.09						*	*
Essex Farm Dairy Co.,	Lotherville, Md.	.06	.09	.06						
Phila. Dealer No. I,	Phila., Pa.,	.05-.06	.08	Do not know	.0054				†	†
Phila. Dealer No. II,	Phila., Pa.,	.....	.....	.....	.00427 18,840.20	$19,587 67	$6,390 00	$6,400 00	$42,248 29	$25,566 75
Phila. Dealer No. III,	Phila., Pa.,	.06	.08	No record kept	.0097	.....	.....	.....	.....	.....
Phila. Dealer No. IV,	Phila., Pa.,	.05784	.08	.05857	.01223 qt.	.....	.....	.....	.005	.....
Phila. Dealer No. V,	Phila., Pa.,	.055 and up	.08		$11,489.59	.....	.....	$2,488 50	$6,733 15	$5,085 78
City Dairy Co., Gardiner Branch,	Baltimore, Md.,	.0747	.0919	Not available at this time	.....	.....	.....	.....	Not available at this time	.....

*These items are included in $.015 given in table on page 41.
†These items are included in $.0127 given in table on page 41.

Cost Items in Milk Distributions.—Continued.

Name.	City—State.	Bottling Expenses.			Route Expense.				Stable Expense.	
		Glass bottles and breakage.	Bottle boxes.	Interest on investment.	Delivery and advertising.	Wages.	Loss of bottles.	Ice.	Feeding horses.	Maintenance of wagons and harness.
Abbott's Alderney Dairies,	Phila., Pa.,	$20,413 79 .0013	Caps $3,214 .0002	Freight handling $30,332 42 .002	$109,082 00 .00716	$185,923 65 .0121	$3,326 74 .00022	$3,569 79 .00022	$51,668 32 .0033	$16,331 04 .00107
S. Shapiro,	Phila., Pa.,									
S. Shechter,	Baltimore, Md.,	.015 qt.								
Essex Farm Dairy Co.,	Lotherville, Md.									
Phila. Dealer No. I,	Phila., Pa.,	.0127			.0222				*	
Phila., Dealer No. II,	Phila., Pa.,	$14,511 30	$4,898 07 .00933	$24,700 00	$1,095 49 .01018	$118,795 21	$1,200 13	$1,000 29	$21,050 91 .00423	$21,444 16
Phila. Dealer No. III,	Phila., Pa.,	.0104		Not included	.0118				.0068	
Phila. Dealer No. IV,	Phila., Pa.,	.054 case		Not included	.17831 (Including stable expenses)					
Phila. Dealer No. V,	Phila., Pa.,	6,356.95	382.12		543.61	27,970.19		$567 29	$7,245 53	$696 50
City Dairy Co., Gardiner Branch,	Baltimore, Md.,	†								

*Included in delivery. †Not available at this time.

Cost Items in Milk Distribution.—Continued.

Name.	City—State.	Stable Expense.		Office Expense.		Milk delivered per day.	Economy in elimination of duplication in delivery.	How.	Total distribution cost.
		Wages.	Motor trucks.	Wages.	Stationery.				
Abbott's Alderney Dairies.	Phila., Pa., ...	$15,024 39 .00099	$13,663 60 .00094	$21,996 83 .0013	$5,110 51 .0003	285 qts. wagon	Do not know		$692,424 44 .045 qt.
S. Shapiro, ...	Phila., Pa., ...	.....	.....	.....	.....	375-400 qts.	Yes		$4,050 .01315 qt.
S. Shechter, ...	Baltimore, Md.,	‡	‡	‡	‡	300	Yes		.015 qt.
Essex Farm Dairy Co.,	Lotherville, Md.	.....	.....	.....	.....	150-300 qts.	No		Not available.
Phila. Dealer No. I,..	Phila., Pa., ...	.....	.....	.....	.....	300 quarts per route.	Great economy	By further consolidation of companies.	.049 qts.
Phila. Dealer No. II,..	Phila., Pa., ...	$8,291 01	....	$5,200 12 .0086	$5,108 29				$346,298 03 .028 qt.
Phila. Dealer No. III,	Phila., Pa., ...	.....	.....	.0024	.....	300 qts.	Very little	Routes are as heavy as a man can serve.	.0411 qt.
Phila. Dealer No. IV,	Phila., Pa., ...	.....	.....	.0388591	.....	27 cases			
Phila. Dealer No. V,..	Phila., Pa., ...	$3,241 99		$3,075 41	Other overhead expenses: $11,152 77 $2,775 35 Supt.	234	Yes	*	$107,687 87 .03279 per qt.
City Dairy Co., Gardiner Branch.	Baltimore, Md.,	.....	.....	.....	.....	620 qts. wholesale wagon. 280 qts. retail wagon.	†	Cannot say.	Not available at this time.

*Consolidation of dealers going out of business by selling out. Localization of territories by dealers themselves.
†Yes, to the extent of the route gallonage actual, to the same amount possible or ideal.
‡These items are included in $.015 given in table on page 41.

Your Commission recommends that all milk distributors and milk distributive plants be hereafter regarded as quasi public businesses and subject to governmental regulation the same as are other quasi public concerns. The reasons in actual fact for this recommendation are:

1. There are economies necessary and essential to large scale distribution of milk,—economies that make for large sized businesses as compared with small sized businesses. Among these economies are the following:

(a) The cost per quart for pasteurizing milk including the investment for plant and operating costs decreases with increase in the size of the plant, and in the amount of milk handled.

(b) There is also a decrease per unit in the cost of bottling milk, including the purchase of stoppers, and the process of bottling itself.

(c) There are economies in route service certainly up to the point where the route is as heavy as one vehicle can serve. Herein lies the greatest single economy in large scale service.

(d) There are further economies in motor truck distribution from the freight stations to the stations where the milk is transferred to individual milk wagons.

(e) There are economies possible in large scale buying and sterilizing of milk bottles.

(f) The cost per quart for handling milk at the creamery and receiving stations decrease with the quantity of business.

(g) There are possibilities of larger sales through effective advertising than could be profitably undertaken by the small dealer. Moreover large scale distribution would eliminate duplicate competitive advertising.

(h) Laboratory work can be carried on more effectively and at less relative cost per unit and without useless duplication.

(i) There is large saving in overhead charges.

2. The public is interested in the milk distribution business as a public utility not only because of the economies in large scale distribution but also because competition, as in railways and other public utilities, is ruinous if real and worthless as a price protector to farmer and consumer if unreal.

3. We further believe that localization of territory or zone monopolies is inevitable save for special brands of milk and save to the extent that the public, for a time, may prefer the milk of one dealer to the milk of another.

4. The price of milk is as vital certainly as the charges for common carriers or for electricity or gas or street railways.

5. The sanitary safety of milk is certainly as vital as if not more vital than the sanitary safety of water.

6. The price for milk depends largely upon the economies in production and milk distribution. Milk is a food that is absolutely requisite for babies and growing children.

We do not hold that the small dealer does not have a very proper and effective place in the milk distribution business and as a check on the prices of the large distributors. We do believe that the tendency is, and has been in the past ten years, toward large scale distribution. At the present time the fifty or sixty members of the Philadelphia Milk Exchange handle some seventy per cent. of the milk business in Philadelphia. The milk business requires extensive capital. Thus one company has over three hundred thousand dollars invested in its business in the city of Philadelphia, and handles some thirty thousand to forty thousand quarts of milk per day. Of the 191,387,865 quarts of milk received in Philadelphia during the year 1915, approximately 16,067,676 quarts or 8.3 per cent. of the total were handled by one firm, 15,000,000 quarts or 7.8 per cent. by another firm, 11,996,151 quarts or 6.2 per cent. by another firm, 27,675,632 quarts or 14.4 per cent. by another firm, 9,641,918 quarts or 5 per cent. by another firm and 3,283,438 quarts or 1.7 per cent. by another firm, or nearly half (4.34 per cent.) by these six firms.

We feel that the upward limit in the size of the milk distribution business is to be determined only by economical management and is relative to the size of the city and similar matters. We recognize that a point of maximum size from the point of view of economy may be reached. But management is more or less a personal matter and as the science of management is growing, we must properly expect the continuation of the centralization of the milk business in the hands of large dealers.

For these reasons we feel that the public interest in the milk distribution business should at once be recognized to the extent of regarding such businesses as quasi public concerns.

The Alternatives

We have given careful consideration to the alternatives to recognizing the milk business as a quasi public business. Among these alternatives are (1) the public ownership of pasteurization plants in order to give equality of economic opportunity to the small dealers; (2) co-operative retail delivery by dairymen; (3) public ownership of milk distributing plants and (4) farmers' stations within the city for co-operative wholesale milk delivery.

If our belief is correct that the tendencies toward large scale business in milk distribution is inevitable because of economies incident thereto, then there can be little gained by the public's trying to aid the small dealers through publicly owned and operated pasteurization plants. Certainly cooperative retail or wholesale delivery of milk by dairymen in the city must be preceded, if advisable at all, by more thoroughgoing cooperation among them in milk production and transportation and such other immediate problems. We do not say that such cooperative deliveries cannot be successful. We believe only that under the present circumstances they will not be effective if the quasi public character of the milk distributing business is recognized. We believe that the municipal ownership of milk distributing plants should properly follow the trial of public regulation if advisable at all and not precede it. Farmers' stations for cooperative wholesale milk delivery we regard as a feasible method only in and when it appears after public regulation and inquiry that such stations can and will offer milk to the consumer at lower prices than those available at the wholesale and retail stations kept by the dealers.

Milk Distribution a Public Utility

The recognition of the principle that the milk distribution business is a public utility implies:

1. That accounts shall be kept in a form prescribed by the state. A number of states have made such provisions already as to commission merchants as well as to the usual quasi public business.

2. The right of the state to examine the books, records and accounts of the milk dealers must be recognized the same as it is with common carriers and municipal utilities.

3. The right of complainants of access to material facts.

4. The right and duty of the state to prescribe the form of annual reports.

5. The necessity of requiring that all dealers be licensed in order to control the purity and food value of the milk supply. (This is already done.)

6. The licensing of testers in the various receiving stations by the state especially now that the basis of pay to the dairyman for his milk is a butter fat test. (See section on Grading of Milk).

7. The same price to all under substantially similar circumstances and conditions.

We recommend that the supervision of milk dealers including authority over accounts and annual reports should be given to some state board.

In making these recommendations the Commission wishes to commend the attitude of the milk dealers at present and throughout the past. They have not only been willing to cooperate with existing governmental agencies but have furthered the growth and efficiency of such agencies. The dealers on this commission, as have other dealers, join heartily in this further increase of public service in the milk business.

Price to Consumer.

A steady price to the consumer throughout the year is of value alike to the dealer, to the consumer and to the farmer. To the dealer it makes possible a uniform method in collection and payment of bills and allows careful purchasing throughout the year. This does not mean, however, that the price that should be paid to the farmer must be uniform in summer and in winter because the winter price must necessarily be higher than the summer price in order to pay for the additional cost and trouble of producing milk in the winter months, unless some better method be devised for attaining the same end.

Publicity of Receipts of Milk.

The commission recommends that the carriers make available weekly to the press the total amount of milk received over their lines during the preceding week. The receipts of milk on the New York market have been so available for a number of years.[1]

[1]This recommendation was transmitted to the carriers by the chairman. The carriers responded that they would make reports of the monthly receipts, itemized as to cream, milk and condensed milk, available to the Agricultural Service Bureau of The Corn Exchange National Bank for Philadelphia, to Mr. Wesley Webb, of the Delaware State Board of Agriculture for Wilmington, Delaware, and to Mr. John M. Dennis, President of the Union Trust Company of Baltimore, for Baltimore, Md.

THE SURPLUS MILK SUPPLY.

COMMITTEE IN CHARGE: D. G. Harry, Maryland, *Chairman;* Frederick Brady, Delaware; Clyde L. King, Pennsylvania; Samuel M. Harrington, Delaware; Morris T. Phillips, Pennsylvania.

By surplus milk is meant the excess of milk which is produced at certain seasons of the year above the normal consumption. The problem of the milk surplus involves finding a market for this extra, seasonal, milk surplus.

The exact time of the occurrence of the milk surplus of course varies from state to state, as well as within narrower boundaries, but in general it may be said to come in April, May and June, while there may be a corresponding decrease below the average in certain other months, particularly in October, November and December.

If the farmer gives the dealer for three months of the year say one-fifth more milk than the distributor may be able to sell through his ordinary channels, the dealer must either have on hand some other means of getting rid of this extra milk at the usual market price, or he must pay a smaller amount to the producer. Similarly, if the producer has a contract with the distributor to furnish him with a certain amount of milk per day, and has, therefore, at times a surplus on hand which he is unable to get rid of, except through extraordinary channels at very low rates, it necessarily follows that he must get more for the milk he does sell.

In general there are two ways in which the milk surplus may be utilized: It may be converted into such form as will allow it to be stored for at least several months; or there may be created some new demand for milk at the particular season at which the surplus comes. If the first means be selected, and the form changed, there are three products into which it is most usually converted: butter, cheese and condensed milk. In any of these firms, spoilage will not set in for a long time, while condensed milk may be kept indefinitely. And finally cream may be taken from the milk and stored for as long as six months.

Butter and cheese have usually been made in localities where transportation to market has been poor, and hence where milk would spoil if it were shipped for use in its fresh state. This is as true of the old household industry that turned out butter and cheese, as of the newer factory industry that has sprung up in the last half-century. Also, countries with a surplus of milk for the needs of

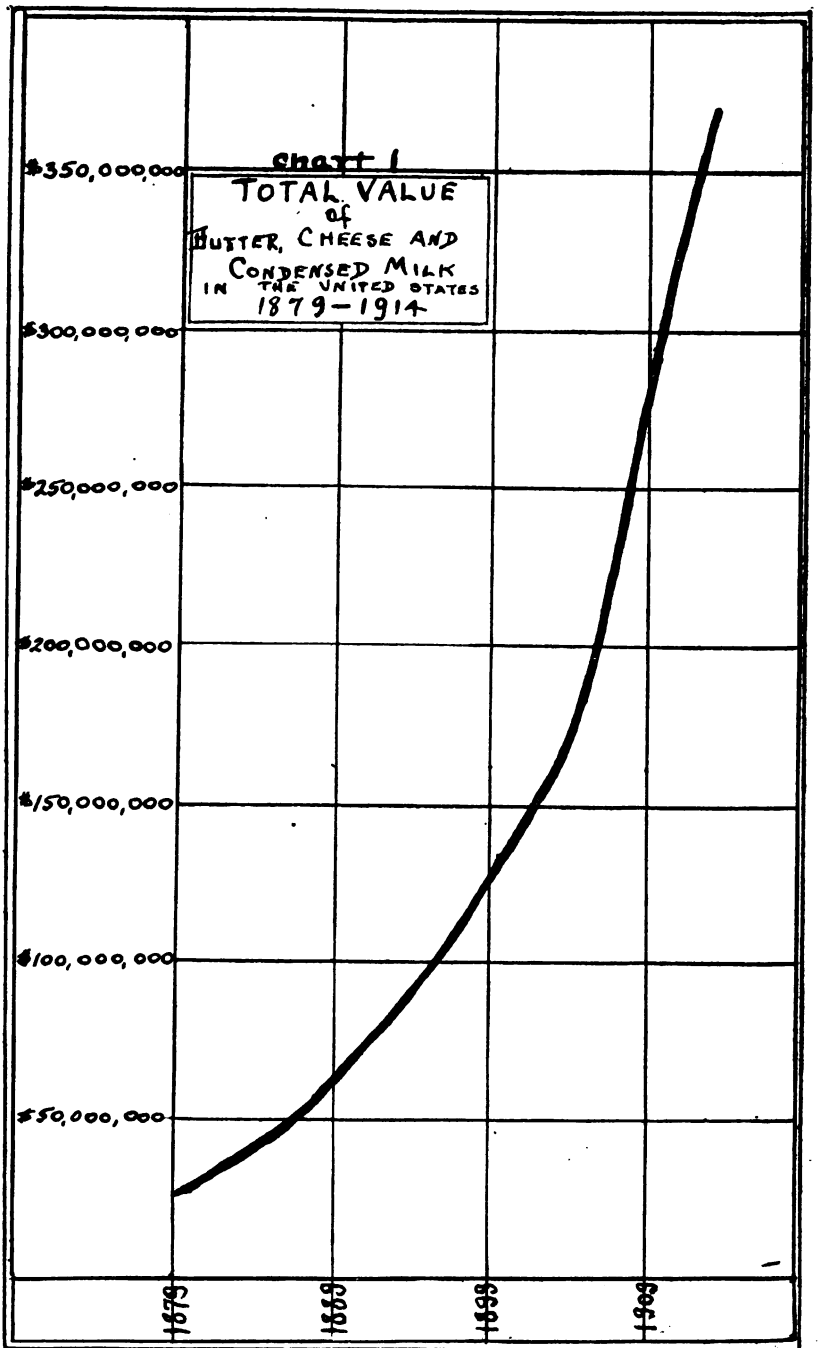
their population have with the right kind of organization turned to the export of butter and cheese. Holland and Denmark are striking examples of such countries.

A newer method of changing the form of milk, so that it will not spoil, is to make it into condensed or evaporated milk. Condensed milk, it is true, has been found to have a limited market. There is a large portion of the population that does not find in it an entirely adequate substitute for fresh milk. But notwithstanding these limitations, there is a large and permanent market for the product. Not only is the domestic market available, but there is also an exceedingly large permanent export market to frontier regions, or to regions where, because of climatic conditions, milk cannot be produced. These latter markets are, of course, not only available for condensed milk, but also for butter and cheese. One of the principal causes of the great growth in the production of condensed milk during the last few years is a huge increase in export trade, both with Europe and with remote districts, such as Alaska. The total value of butter, cheese and condensed milk products in the United States in 1914 was $370,818,729, which was an increase of over 35 per cent. from the figures of 1909 (275,277,090). There will be a steady and probably increasing export market for milk products, so if the home market will not absorb them, the foreign market will. That the foreign market will continue to be a large one for some time is evidenced by the fact that Germany and other of the belligerent states have adopted the plan of killing off cattle over two years of age with the definite policy of reducing the number to those that can be sustained by roughage human beings can not eat or by pasturage on lands that will not profitably grow human foods.

There has been a steady increase in the production of the three products, butter, cheese and condensed milk, in the United States since they were first made in factories, as is shown by Chart No. 12, and this trade has increased far more rapidly in the last ten years than previously. We may therefore say that we have an expanding market for these milk products.

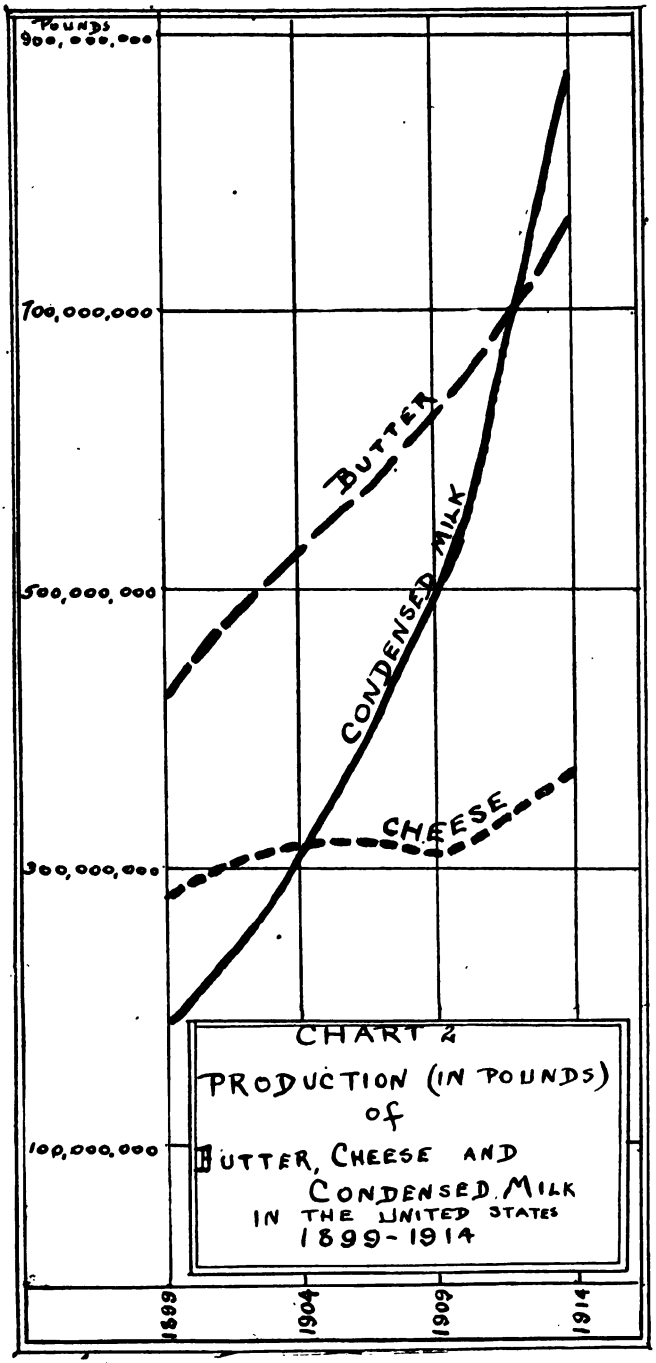
The increase in the production of condensed milk has been far more rapid than has been the case with either butter or cheese, as is shown by Chart No. 13, and it is altogether probable that, if other factors make it practicable, condensed milk would be the largest outlet for our surplus milk supply.

It has been suggested that ice cream would furnish an outlet for the surplus milk. But ice cream in most urban centers is now most profitably made from cream with the body from milk powders and not from whole milk. Hence there is a decided limit to the use of surplus milk for ice cream, unless the whole milk be purchasable at very low prices. However, the dates of the surplus maximum and



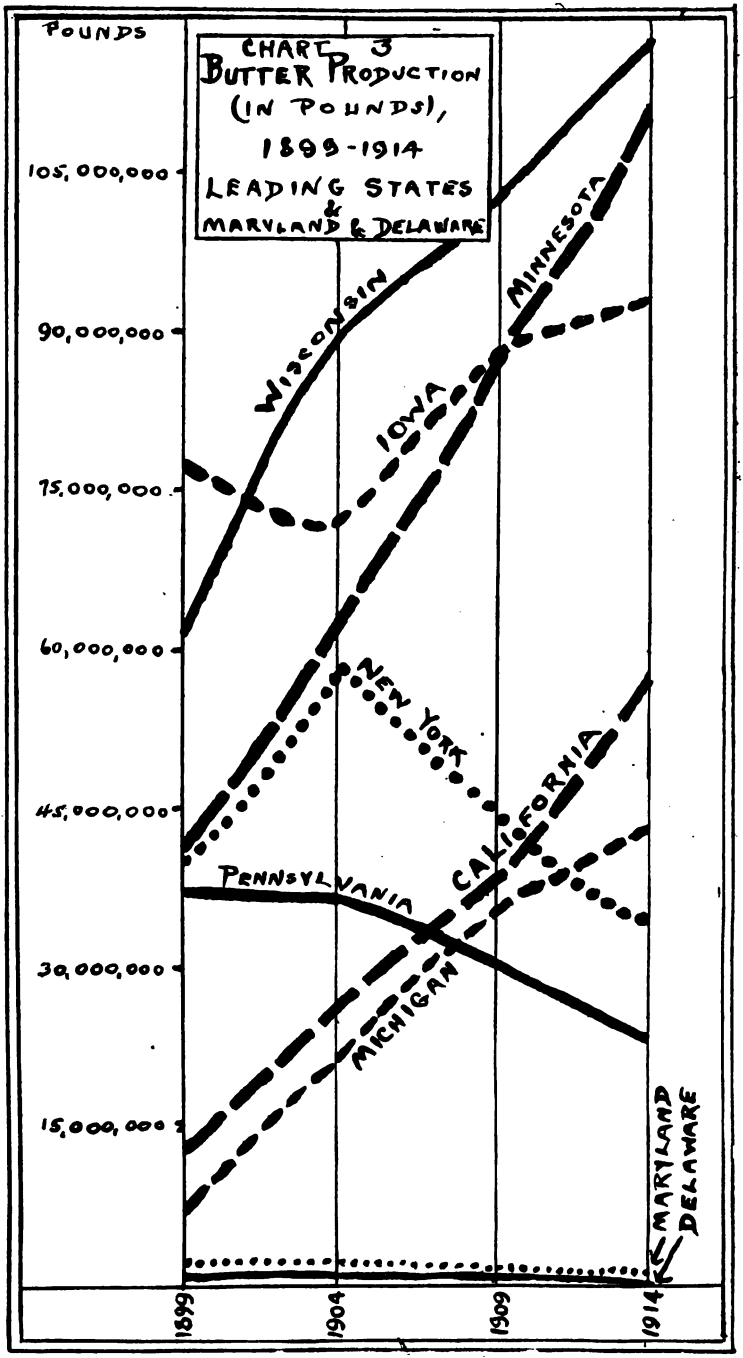
Prepared by R. H. Lansburgh, University of Pennsylvania.

CHART 12.



Prepared by R. H. Lansburgh, University of Pennsylvania.

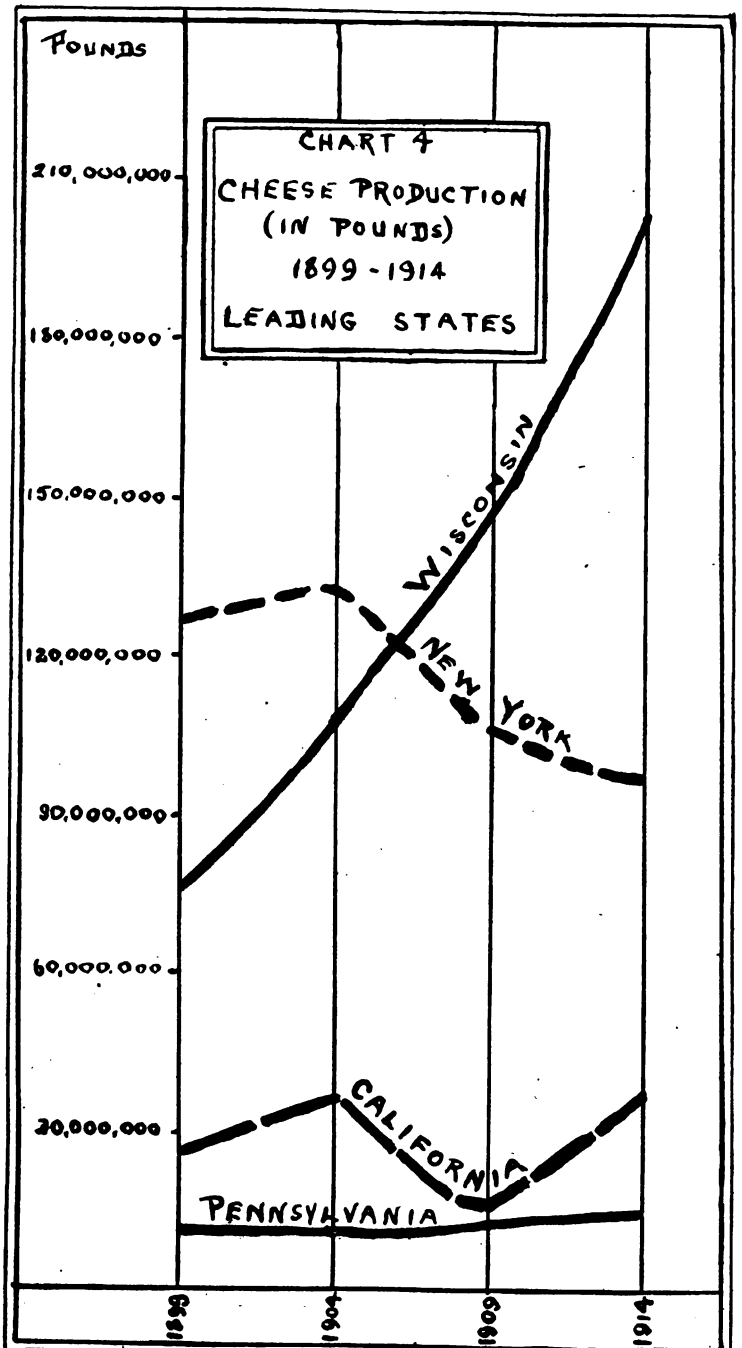
CHART 13.



Prepared by R. H. Lansburgh, University of Pennsylvania.

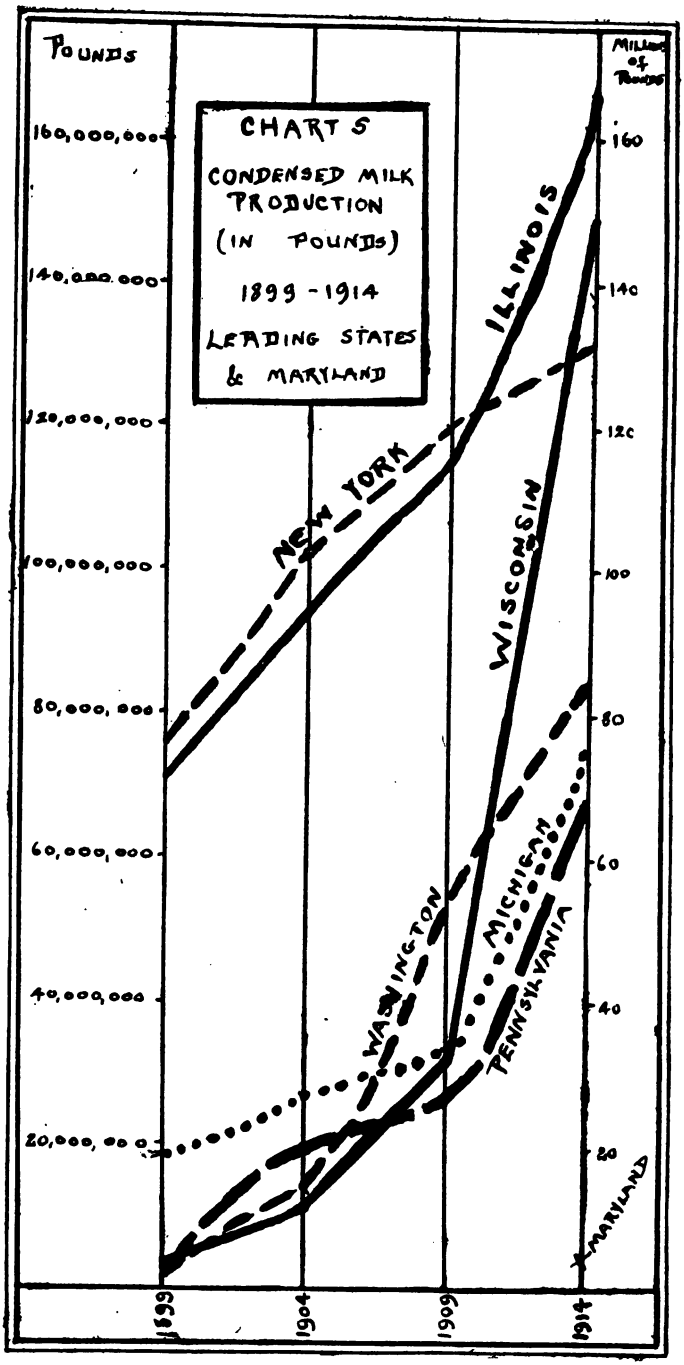
CHART 14.

These charts and the other charts in this section, based on figures from the United States Census, were prepared by R. H. Lansburgh, Instructor in Industry in the University of Pennsylvania.



Prepared by R. H. Lansburgh, University of Pennsylvania.

CHART 15.



Prepared by R. H. Lansburgh, University of Pennsylvania.

CHART 16.

the ice cream consumption maximum do not exactly correspond, with the result that the making of ice cream is not an entire solution of the surplus problem. Moreover there is an increasing use of ice cream as a year-round article of diet.

There are the same difficulties in the use of surplus milk in the making of confectionery. For this industry, too, is a year-round one, and its maximum use of milk comes in the season of greatest scarcity of milk.

Butter, cheese, and condensed milk factories, are usually located in the remoter dairying districts, where transportation facilities make it exceedingly difficult to take fresh milk to market in a proper condition. For instance, there is little cheese made in the Willamette Valley in Oregon, although it is the principal dairy region of that state, whereas on the Coast, where transportation facilities are very poor, practically all the cheese factories of Oregon are found. In other words, the Willamette Valley has an outlet for fresh milk to Portland, the coast district does not.

The three allied industries, butter making, cheese making, and the manufacture of condensed milk, instead of taking care of the surplus milk of districts tributary to cities, rather use the total supply of the remoter dairy regions, operating as near 365 days a year as they can. Hence, the surplus of the producer of market milk is not taken care of by any of these industries, and it is the surplus of such men which creates the surplus problem.

Milk condensories are not most profitable near large milk products because, during the ordinary times of the year, the market price of whole milk would of course be far higher than the price that the operators of a condensery in a remoter district would have to pay, because of many factors, including both demand for fresh milk and cost of production. The products of the condenseries compete the world over, and there is thus developed a tendency to move them as near as possible to the frontiers of the dairy industry.

An interesting proof of the facts just cited is to be found by reference to Charts Nos. 14, 15 and 16 showing the production of butter, cheese and condensed milk in each of the leading states from 1899 to date.

The most noticeable feature of these charts is the rise of Wisconsin to leadership in these branches of the dairy industry. Wisconsin is a state which we may term as on the frontier of the industry, despite its leadership, and if we studied the state itself we would find similar tendencies being carried out within its own borders. That is we would find that the condensories, for instance, are operated in the districts furtherest away from the great Chicago, and the smaller Milwaukee markets. But the most interesting feature of the charts is the decline, not only relative, but actual, in the butter and cheese

production of New York State, long the premier dairy state of the Union. With the increase in the demand for fresh milk, and the opening up of practically the whole of that state to the great markets it possesses by means of the motor truck and good roads, there is not as much butter and cheese made now as there was fifteen years ago. Condensed milk production is increasing rapidly, perhaps because it is a newer industry than the other two, but relatively it is declining, when compared with any of the Western States. Thus in the condensed milk industry the Pacific Coast State of Washington is making a district bid for leadership, as is California in the butter and cheese industries. Of course there are great cities, with great milk demands in each of these newer states, but they are not so large or so numerous as in the more populous states of the East. The one exception to these statements is found in the case of Illinois, where the increase in condensed milk production has recently been large.

Part of the great increase recently in manufactured milk products is probably due to the hand separator, for some of these products, especially butter, demand cream rather than milk. The farmer is thus able to separate his cream on the farm, feed the skimmed milk to his stock, and take the cream only to market. Evidence that this is occurring is found in the fact that, of the raw materials for manufactured milk products in 1914, cream showed an increase of 69.5% over 1909, while milk showed a decrease of 14.7%, though there is still almost four times as much milk as cream used. But in 1909 the ratio was seven to one.

Condensories, be they located in the remoter districts or nearer the cities, are not markets for surplus milk to any great extent, because they must operate steadily, and because they usually purchase a given amount of milk from a given producer each day. The industry requires expensive machinery, and relatively large investments, requires steady work in order that there may be profitable operation. We find that one-half of all the employees of condensories work every day in the year, a most extraordinarily high percentage relative to other industries, while practically all the remainder work over 330 days. One can readily understand from these facts that the condensories do not handle much surplus milk.

The average cheese-factory employe works between 180 and 240 days a year, many, of course, working more or less than this number of days. Here we see the one industry of the three that is in the best position to utilize surplus, but it is the smallest industry too. In the butter industry, although the men do not work so steadily as in the condensed milk industry, they work above the average of all manufacturing plants. Of course, even the condensories take some extra milk at certain seasons, but not enough to affect the surplus problem.

Solutions of the Surplus Problem

1. There are city distributors, who not only make ice cream, but who also make butter and cheese during the surplus season or store the cream for later use. Thus one firm testified that it has successfully stored cream for six months. This storage of cream with the skim milk left for the farmer to feed on his own farm is one of the best solutions of the surplus problem. The city distributor is also relieving the situation by establishing, in connection with his business, milk manufacturing plants, either ice cream, butter, cheese or condensed milk. This is done, if done at all, in the full knowledge that manufacturing costs will be higher than those of the manufacturer in the remoter dairying districts, for the reasons pointed out above, with the exception of ice cream.

2. Farmers' cooperative creameries as well as commercial creameries can store the cream during the surplus season, turning the skimmed milk back for growing animals.

3. *But the real solution of the surplus problem is to get rid of it entirely by making production more uniform throughout the year by seeing that a larger proportion of cows freshen in and around August, September and October.*

4. To aid in this the dairyman must receive a much higher price relatively in October, November and December than in May, June and July. This same end can be accomplished by contracts paying to the dairyman a steady price throughout the year for that amount of milk delivered during the seasons of scarcity.

5. Better care, feeding and housing of cows especially during the months of minimum supply will increase the output in those months.

GRADING

(Including Laws and Regulations)

COMMITTEE IN CHARGE: Dean Harry Hayward, Delaware, *Chairman;* Hon. George H. Hall, Delaware; Morris T. Phillips, Pennsylvania; Hartman K. Harrison, Maryland.

One of the important duties of the Tri-State Milk Commission was to study the quality and wholesomeness of the milk supplied for direct consumption to the various municipalities of the states concerned.

It is generally recognized that the food value of milk is based upon two main factors: the nutrients the milk actually contains, and the care that has been exercised to obtain milk to be offered for sale from only healthy, normal cows and to keep the milk free from contaminating influences of every character during its transportation from the cow to the consumer.

To determine the food content of milk, certain generally accepted chemical and physical tests are used. These are comparatively simple, easily made and are fairly accurate. A determination of the amount of sediment the milk carries, as well as the number of bacteria it contains, gives a reliable indication of the sanitary conditions under which the milk is produced, cared for, and of its general wholesomeness. None of these tests is sufficient in themselves, but all should be used in determining the value of milk for human use.

The main reason for grading market milk is that the consumer may get what he pays for. Standard grades are now quite generally recognized and the following recommendations of the Commission are in harmony with the grades advocated by authorities on this subject and are used by many cities in adjoining states. It is important that these grades be uniform among the states.

The inadequacy of milk inspection even in cities is shown by the following tables submitted to the Commission by Dr. Neva Deardorff showing the amount now spent on food inspection in Philadelphia and the amount necessary to spend in order to have adequate milk inspection.

Present and Proposed Milk Inspection Budget for Philadelphia. Submitted by Dr. Neva Deardorff.

Details.	Present Budget. Used for milk and other food inspection.		Recommended Budget. For milk inspection exclusively.	
	Number & salary.	Amount.	Number & salary.	Amount.
Total,		$18,620		$30,120
Chief milk inspector,	1 @ $1,900	1,900	1 @ $1,920	1,920
Assistant milk inspector,	16 @ 1,020	16,320	18 @ standardized salaries.	22,360
Clerk,			1 @ $900	900
Printing, stationery and office supplies.		400		1,000
Car fare,			15 inspectors @ $60 per year each.	900
Upkeep of automobiles,			3 automobiles @ $15 per month each.	540
Purchase of samples of milk,			10,000 samples at average of $.05 each	500
Purchase of automobiles,			3 @ $500 to $800;	*2,000

*No automobiles owned at present; first year will, therefore, entail greater expenditure than succeeding year.

The question of grading milk has been discussed quite generally during the year. The producers are in favor of it because they believe higher prices can be obtained for the higher grades of milk. The consumers are anxious to obtain milk of different known reliable grades for children, adults, cooking, etc. The Commission feels that grading milk will be established slowly, and it recommends the adoption of standards without delay, that is to say, after a thorough study of the local conditions, and with the cooperative effort of producers, distributors, consumers and health officials.

As to its *Sanitary Character,* the Committee recommends in addition to certified milk, three grades of milk, the first two of which would be for use as milk, the last or lowest grade for cooking and manufacturing purposes: Grade "A," Grade "B" and Grade "C."

As an indication of the general plan suggested for adoption, the following outline is given.

Milk Grades.

Label,	Certified or "AA" Milk.	"A"	"B"	"C"
Cows,	Tuberculin Test and Physical Examination.	Physical Examination.	Physical Examination.	Physical Examination.
Men,	Medically Examined.	Sickness to be reported.	Sickness to be reported.	Sickness to be reported.
Bacteria, raw,	10,000 to 60,000.	10,000 to 200,000	As determined by proper board.*	
Farm score,	80	68	55	40
Bottling,	Required.	Required.	Bottles or cans.	Cans only.
Pasteurization,		Required.	Required.	Required.
Bacteria immediately after pasteurization.		10,000 to 30,000	50,000 to 75,000.	50,000 to 100,000.

*The Commission believes that the standard for bacteria in grade "B" milk should be from 200,000 to 2,000,000, but the difficulties in the way of the immediate adoption of this standard are such that the matter should be left at the discretion of the proper public authority.

The *barn scores* suggested are to be taken as something to work to rather than as an arbitrary standard.

When milk is sold as certified under the requirements of the American Public Health Association, the grade lettering should be optional, not required.

In order to get the *beneficial results of grading,* grades should be established, so that a reasonable amount of the total supply will be in Grade "A." This can be done by a *careful study* of the *existing conditions in the locality under consideration, as suggested.* In grading milk, the grades shall be established after five tests taken over a period not exceeding seven days. All grading shall be established after at least five bacterial tests have been taken over a period not less than a week nor more than a month, and at least 80% must fall below the limit set, for the grade for which the classification is desired.

Chemical Requirement Recommended

Minimum requirements for *solids not fat in normal milk, skimmed milk,* and *adjusted or standardized milk* should be 8.25.

Minimum requirements for *fat* in milk *not* labeled and guaranteed to be 3.25.

Standardization of Fat

The Commission favors the immediate altering of laws, so that the fat in milk can be bought and sold with regard to the true value—in the same manner as the purchase and sale of cream is now done.

In this way the consumer will more rapidly appreciate the true food value of the milk he buys.[1]

The standardization of milk should be allowed by the addition of milk, skimmed milk or cream.

When *labeled* and *guaranteed* as to its fat content, milk testing 1% or more should be allowed to be sold.

Present Legal Standard[2]

State.	Milk.			Skim milk	Cream.
	Total solids.	Solids not fat.	Fat.	Solids not fat.	Fat.
Pennsylvania,	12.00	.....	3.25	9.25	18
Delaware*,	.....	.....	.....	.....	.....
Maryland,	12.5	.....	3.50	9.25	18

*No State standards.
[1]See "Grading and Labeling of Milk and Cream," issued by Boston Chamber of Commerce—page 18.
[2]Legal Standards for Dairy Products, U. S. Dept. of Agriculture.

Minimum Requirements Recommended for These States.

State.	Milk.			Skim milk	Cream.
	Total solids.	Solids not fat.	Fat.	Solids not fat.	Fat.
	.....	8.25	3.25	8.25	18

In some localities there is dissatisfaction with the methods of testing for butter fat. To overcome this condition, in a large measure, laws should be passed granting licenses to creameries, milk receiving stations, and establishing rules and regulations for persons making tests for fat.*

As a means of assuring proper standards in the production and distribution of milk and in the purchase and sales price for milk, the Commission makes the following recommendations:

1. As the only adequate means of controlling the sanitary conditions under which milk is produced permits should be issued to producers. This permit should be issued by the appropriate State Board and the fee, if fee there be, should not be in excess of one dollar.

2. Permits to be issued to all producers, distributors and receivers of milk. If the same person or firm carries on more than one of these businesses, then he shall have a license for each.

3. All milk, skimmed milk or cream not covered by the above permits must be brought into the State, inspected, and sold under the provisions of a special permit to be issued by the proper state authority.

4. The basis of inspection should be the government score card, or its equivalent system.

5. Producers' premises should be inspected as to sanitary conditions, at least three times a year.

6. All animals producing milk for sale should be physically examined by a competent veterinarian, and these veterinarians should work under the direction of the livestock sanitary boards or bureaus of the respective states. These veterinary inspections shall be made at least twice (2) a year.

7. Dairy and farm inspectors should be appointed by the State Board of Agriculture or Agricultural Commission from a list of

*Circular 41. Purdue University, Agricultural Experiment Station.

men submitted by the State College. Said college to make up this list from the men who have taken and passed competitive examinations. The inspectors appointed shall inspect all places producing, receiving, or handling milk.

8. Milk testers shall be licensed after proper examination. The Committee cannot offer definite rules for preventing dishonesty of testers, but if a tester should be found to have knowingly made a dishonest test, his license should be revoked.

The Commission has read the following proposed inspection law drawn by the State Livestock Sanitary Board of the Department of Agriculture for enactment in Pennsylvania and approves its general principles.

AN ACT

Relating to milk and milk food products; providing for the licensing of certain establishments producing, handling or manufacturing milk or milk food products; providing for the licensing of persons shipping or bringing milk or cream into this State; prescribing certain powers and duties of the State Livestock Sanitary Board, its officers and agents and prescribing a penalty for the violation of this act and of the rules and regulations of the State Livestock Sanitary Board.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same; That the following terms wherever used in this act shall have the following meanings, respectively, designated for each, viz:

The terms "milk" and "milk food products" shall include and apply to cream, whole milk, skim milk, butter milk, butter, cheese, condensed and evaporated milks and food products made from milk or cream.

The word "establishment" shall include (1) any building or structure, or any place, or any vehicle, or railroad or railway car where milk or milk food products are produced, stored, handled, transported, sold, offered for sale or exposed for sale; (2) the ground upon which such building or structure is erected, and so much ground adjacent thereto as is used in carrying out the business of such establishment.

The term "unwholesome" shall include all milk or milk food products which are obtained from animals that are afflicted with anthrax, blackleg, contagious pleuro-pneumonia, rinderpest, hemorrhagic septicemia, Texas fever, foot-and-mouth disease, rabies, mastitas, septic-metritis, pyemia, septicemia, advanced cases of actinomycosis or actinomycosis of the udder, advanced or generalized tuberculosis, tuberculosis of the udder, or any other disease or condition rendering milk produced from animals afflicted therewith unsuitable or dangerous for food.

The term "unwholesome" shall also include milk or milk food products which have been placed in unclean vessels or exposed to unsanitary conditions, and all other milk or milk food products which, in the opinion of the State Livestock Sanitary Board are unfit for human food.

The word "equipment" shall include all cattle, machinery, fixtures, containers, vessels, tools, implements, and apparatus used in and about an establishment.

The word "person" shall include individuals, co-partnerships, corporations and associations. Masculine words shall include the feminine or neuter. The singular shall include the plural.

The word "Board" shall mean the "State Livestock Sanitary Board."

Section 2. Every establishment, including all equipment therein or thereon, shall be kept in a clean and sanitary condition.

Section 3. It is unlawful for any person to prepare for food, or sell, or offer for sale, or expose for sale, or have in his possession for the purpose of sale, as human food, any unwholesome milk or unwholesome milk food product.

Section 4. It is unlawful in an establishment for any person other than the owner, lessee, or manager of such establishment, or the agent or employe of such owner, lessee, or manager, to touch or handle any milk or milk food products, or for any one to permit any milk or milk food product in an establishment to be exposed to insects, animals or fowls.

This section shall not apply to any agent of any of the Boards of inspection now authorized by law.

Section 5. It is unlawful for any person, his representative or agent to advertise, sell or offer for sale milk as "certified milk" unless such milk has actually been certified under authority of a duly organized medical milk commission recognized by the American Association of Medical Milk Commissions.

Section 6. Before the first day of January, one thousand nine hundred and eighteen, and before the first day of each succeeding year, every person operating any establishment where milk or milk food products are sold, or produced, or prepared, or manufactured, or collected, or any two or more of them, shall register each such establishment operated by him with the Board giving the location and the name and address of the owner thereof.

No such establishment shall be licensed which has been found to be unsuitable for the purposes for which the license is sought. The form of such license certificate shall be prescribed by the Board.

The fees paid to the Board under the provisions of this section shall be immediately paid into the State Treasury for the use of the Commonwealth.

Section 7. On and after the first day of January, one thousand nine hundred and eighteen, it shall be unlawful for any person to operate any establishment where milk or milk food products are sold, produced, prepared or manufactured, or collected, without obtaining a license for the current year from the Board.

Section 8. If, at any time, after the issuance of a license, and within the period for which such license is issued, it is found that the condition of any licensed establishment is not such as represented in the application for a license, or if within such period its condition falls below the standard prescribed by the Board entitling it to such license, the Board may revoke the license.

Section 9. Any person, who is aggrieved by the refusal of the Board to issue a license, or by the revocation of a license, may, within thirty days after the order of the Board refusing or revoking such license, file a petition in the court of common pleas, praying for a review of such order by the court. Pending such review and until a decree of said court has been made granting or refusing the same, such license shall forthwith be issued or reinstated, and the whole case shall be heard and determined by the court upon petition, rule, answer and testimony, in such manner as the court may by order direct.

Section 10. After the first day of January, one thousand nine hundred and eighteen, no person shall ship or bring into this State, (from without the State), for use as human food, any milk or cream, unless such person has made application for and secured a license so to do from the Board. Applications for such licenses shall be made before the first day of January, one thousand nine hundred and eighteen, and before the first day of each succeeding year. The application for any such license shall state the location of the establishment where such milk or cream is produced or collected, and the name and address of the owner, and shall be accompanied by a fee to be fixed by the Board, but in no case to exceed one dollar. Such fee shall in all cases be uniform.

Upon the receipt of any such application, if the Board if satisfied that the establishment in question conforms to the standard required by this State for similar establishments, it shall issue a license to such person authorizing him to ship or bring milk or cream into this State for use as human food, otherwise the Board may refuse a license. If the Board refuses to issue any license it shall return the fee enclosed with the application.

If any person shall ship into this State from without the State, any milk or cream, without securing the license required by this Board, or any agent of the Board, is authorized to condemn such milk or cream and to mark and treat the same in such a way that the same cannot thereafter be used as human food.

The Board may revoke, at any time, any license issued under this section, if it is satisfied that the establishment, where such milk or cream is produced, or collected, falls below the standard required by this State for similar establishments.

This section does not apply to any establishment producing or collecting milk or cream in any State where this act or similar provisions are adopted and enforced and which allows like privileges to the citizens of this State. This section shall not be construed in case an unforseen emergency arises creating a shortage of milk in any part of this State, to prevent the shipping or bringing into this State of any milk or cream for a period of not more than five days, in order to relieve such milk shortage.

Section 11. The Board may classify all establishments where milk or milk food products are sold, produced, prepared or manufactured, with a view of making such classification the basis for the issuance of the licenses provided for in this act.

The Board may also fix standards for grades of milk and cream to apply to milk and cream produced outside of, and shipped into the Commonwealth, as well as to milk and cream produced within the Commonwealth.

Section 12. The Board, in enforcing the provisions of this act, may assign any employe of the Board to perform duties as agent under this act.

Each employe assigned to serve as agent under this act shall have knowledge of the diseases of milk producing animals, and shall be versed in the conditions that affect the wholesomeness of milk and milk food products. An appropriate standard of fitness for such agents shall be maintained by the Board.

The qualification, powers, and duties of each such agent shall be governed by the provisions of this act, and by such rules and regulations for the enforcement thereof as are adopted by the Board.

Section 13. Any duly authorized agent or employe of the Board may, at any time, enter any establishment and examine the same, to ascertain whether the provisions of this act are being observed.

Section 14. It is unlawful to hinder, impede, or prevent any duly authorized agent or employe of the Board from entering any establishment in the performance of his duty, or from making any examination ordered in enforcing this act.

Section 15. If, upon examination of any establishment any unwholesome milk or milk food products is found, such milk or milk food product shall be condemned, properly marked or designated, and treated in such a way that it cannot thereafter be used for human food.

Section 16. If, upon examination, it is found that any establishment, or any part thereof, or any equipment, is in an unclean or unsanitary condition, or is being conducted or used in such a manner as to make it probable that the milk or milk food products therein, or produced therein, may be rendered unwholesome, or if it is found that such establishment or any part thereof or any equipment is being conducted or used in violation of this act, or if milk is being produced from animals affected with any of the diseases or conditions enumerated in section one, clause three of this act, the agent making such examination shall report such unlawful condition to the Board, and shall at the same time in writing, notify the owner, lessee, or manager of the establishment.

Upon receipt of such report, the Board, by its executive officer, or otherwise as it may direct, shall notify the owner, lessee, or manager of the result of the examination, and direct that the unlawful condition be remedied within the time specified in the notice. The time so specified shall be not less than twenty-four hours, unless the unlawful condition mentioned in the notice can, in the opinion of the Board, its executive officer, or its agent, be removed immediately.

If, upon the expiration of the time specified in the notice, the condition so reported to exist is not remedied, the Board, by its executive officer, may order the owner or any of his agents or employes to discontinue the use of such establishment for preparing, transporting, selling, offering for sale, exposing for sale or giving away any milk or milk food products to be used as human food, or any milk or cream for the preparation of milk food products.

It is unlawful to use such establishment or any part thereof for transporting, selling, offering for sale, exposing for sale or giving away any milk or milk food products to be used as human food, or any milk or cream for the preparation of milk food products, until the unlawful condition reported to exist has been remedied to the satisfaction of the officer of the Board.

The closing of an establishment, or any part thereof, for the purposes enumerated in this section, shall not preclude prosecution for violation of this act.

Section 17. It is unlawful for any agent of the Board:—

1. To approve or pass any milk or any milk food product found to be unwholesome:

2. To fail to condemn and mark, and treat in such a way that it cannot thereafter be used as human food, any unwholesome milk or unwholesome milk food product, found on examination of an establishment to be unfit for human food;

3. To fail to report as required any violation of this act;

4. Directly or indirectly to accept or agree to accept anything of value, monetary or otherwise, given or offered to such agent to influence him in the discharge of his duties:

Section 18. It is unlawful for any person to give or offer to give, directly or indirectly, to an agent or employe of the Board, anything of value, monetary or otherwise, with intent to influence such agent or employe in the discharge of his duties under the provisions of this act.

Section 19. This act shall be enforced by the Board through its officers and agents. To that end the Board shall adopt and promulgate such rules and regulations as are deemed necessary for the enforcement thereof.

Section 20. Any person violating any of the provisions of this act or any rule or regulation of the Board adopted for its enforcement shall be guilty of a misdemeanor, and upon conviction thereof, shall be sentenced to pay a fine not less than twenty-five dollars, and not more than five hundred dollars, or to undergo imprisonment not exceeding one year, or both. If the violation is by a corporation, copartnership, or association, the officers or directors of such corporation or the members of such partnership or association, its agents or employes shall be guilty of a misdemeanor, and on conviction thereof be punished as aforesaid.

The fines imposed and collected under this section shall be paid to a duly authorized agent of the Board, and shall be paid by the Board into the State Treasury, for the use of the Commonwealth.

Section 21. Any duty imposed upon, or power given to the Board by this act, may be done or exercised as the Board may, by standing or special order, direct.

Section 22. If any part of this act shall be declared unconstitutional, such decision shall not affect the remaining provisions of the act.

THE FOOD VALUE OF MILK IN ITS RELATION TO PRICE

COMMITTEE IN CHARGE: Frederick Brady, Delaware, *Chairman;* C. E. Carothers, Pennsylvania; Samuel M. Harrington, Delaware; Clyde L. King, Pennsylvania.

The Commission gave special consideration to the relation of the food value of milk to the price paid by the consumer. Among other experts called to give testimony on this matter was Dr. Alonzo E. Taylor, Professor of Physiological Chemistry of the University of Pennsylvania. The tables given below were all furnished by Dr. Taylor and much of this report is based upon his testimony.

1. Milk is An Absolute Requisite for Children.

Milk is an essential, or at least a highly desirable, food through the entire growth period of childhood largely on account of the quality of protein in it. It is a Grade-A protein. A child ought to have a liter of milk for the first six years and a half liter of milk from that time on to fifteen as part of a mixed diet.

Dr. Taylor laid emphasis upon the fact, which involves milk and everything else, that the basal heat requirement of adolescence is higher by 25% than in the adult. It has been shown that growing boys in a boys' school consume as much food as hard working men, or more, and that there has been from this point of view very widespread sub-nutrition as against the potential between the ages of 12 and 17.

2. Milk as a Food Compared With Other Animal Products.

The following table shows the per cent. of protein and fat and the number of calories supplied by a pound of milk as compared with a pound of animal products.

*Food Value of Milk and Other Animal Products.**

Article.	Weight.	Protein per cent.	Fat per cent.	Calories.
Milk,	1 lb.	3	3.5	300
Butter,	1 lb.	.....	85	3,600
Cheese,	1 lb.	25-33	25-30	2,000
Cheese, lean,	1 lb.	40	3	900
Eggs,	1 lb.	11-12	9.3	600
Beef, fat.	1 lb.	15	26	1,400
Beef, medium,	1 lb.	19	7	900
Pork, fat,	1 lb.	13	26	1,300
Pork, lean,	1 lb.	18	13	900
Fowl,	1 lb.	13	12	750
Herring,	1 lb.	11	4	370
Cod,	1 lb.	8	.....	160

*The figures in this table are Ballod's figures for 1910-1914. They appear in Smaller's Jahrbuch, 1915, page 39.

The higher value of milk for food when compared with other animal products was illustrated as follows by Professor Fred Rasmussen, of State College, Pennsylvania, in his testimony before the commission: "A quart of milk is equal in food value to eight eggs. With milk at 9 cents per quart and eggs at 45 cents per dozen, the consumer pays 3.3 times as much for the same food value when buying eggs as when buying milk. With round steak at 28 cents per pound the consumer pays 2.3 times as much for the same food value as found in a quart of milk at 9 cents."

3. Milk as a Food Compared With Grains, Cereals and Vegetables

The following tables* compares milk with grains, cereals and vegetables as contributors of protein, fat and calories:

Milk With Grains, Cereals and Vegetables.

Article.	Weight.	Protein per cent.	Fat per cent.	Calories.
Milk,	1 lb	3	3	300
Flour,	1 lb.	10-11	.....	1,500-1,600
Oatmeal,	1 lb.	14-16	6	1,700
Bread,	1 lb.	8-9	.....	1,200
Rice,	1 lb.	6-8	.....	1,600
Macaroni,	1 lb.	9-10	.....	1,600
Sugar,	1 lb.	.....	.....	1,850
Split peas,	1 lb.	24	.....	1,600
Peanuts,	1 lb.	19	29	1,900
Raisins,	1 lb.	3	3	1,400
Potato,	1 lb.	1.5	.....	350

4. A striking fact that confronts us when we attempt an analysis of food consumption is that as a people we are, next to England, the heaviest consumers of animal products in the world. Another equally significant fact is that, at the present time, we seem to be the highest consumers of fats in the world. The following table* sets forth the average consumption of protein, in grams, per capita per day in the various countries, the grams of protein that are derived from animal sources, the grams of protein from plant sources; the consumption, in grams, of fat per capita per day in the various countries, the grams of fat derived from animal sources, the grams of fat derived from plant sources, the carbohydrates supplied and the calories.

*The figures in this table are Ballod's figures for 1910-1914. They appear in Smaller's Jahrbuch, 1915.

*The Food Sources of the Nations.**

Country.	Total protein (grams).	Protein from animal sources (grams).	Protein from plant sources (grams).	Total fat (grams).	Fat from animal sources (grams).	Fat from plant sources (grams).	Carbohydrates.	Calories.
United States,	100	60	40	80	76	4	410	2,950
England,	106	62	44	72	62	10	440	2,900
Germany,	87	32	55	61	56	5	385	2,700
France,	95	38	57	44	30	14	420	2,780
Austria,	82	34	48	27	22	5	400	2,500
Russia,	85	22	63	26	16	10	450	2,425
Italy,	86	24	62	52	12	40	430	2,600
Japan,	70	11	59	14	3	11	490	2,360

*The figures used in this table are Ballod's figures for 1910-1914. They appear in Smaller's Jahrbuch, 1915. The data for Japan have been weighted to correspond to racial differences in stature and weight.

5. That the high food value of milk as compared with other animal products has been recognized in the past is reflected in the following table which shows that the per capita consumption of milk in Philadelphia has on the whole been steadily increasing from 1887 to 1915. The basic price of milk has been uniform from 1901 up to the increases in price necessitated by the advance in prices to farmers made in the autumn of 1916. It is to be noted that the per capita consumption increased only and most rapidly during this period of stable prices.

Per Capita Consumption of Milk in Philadelphia, 1887-1916.

Year.	Total population.	Total amount milk received.	Per capita.
1916,	1,907,518	.....	.....
1915,	1,683,664	178,428,898	105
1914,	1,657,810	173,735,846	104
1913,	1,631,956	173,418,806	106
1912,	1,606,105	163,367,091	101
1911,	1,580,250	162,500,579	109
1910,	1,549,008	150,638,818	97
1909,	1,528,540	144,794,863	94
1908,	1,502,685	140,362,996	95
1907,	1,476,830	135,931,188	92
1906,	1,450,976	129,651,082	89
1905,	1,438,318	120,400,970	83
1904,	1,408,154	111,897,365	79
1903,	1,378,624	111,243,033	80
1902,	1,349,712	104,720,142	77
1901,	1,321,408	103,437,344	78
1900,	1,293,697	102,956,308	79
1899,	1,267,464	99,580,074	78
1898,	1,242,964	94,719,082	76
1897,	1,218,464	93,959,340	77
1896,	1,193,964	96,478,913	80
1895,	1,169,464	96,219,884	82
1894,	1,144,964	98,539,164	86
1893,	1,120,464	94,539,994	84
1892,	1,095,964	91,278,774	74
1891,	1,071,464	88,594,420	82
1890,	1,046,964	89,257,884	85
1889,	1,022,464	85,635,162	83
1888,	997,964	82,212,160	82
1887,	973,464	78,178,712	80

An analysis of these factors leads inevitably to the conclusion that increases in the price of milk to the consumer will lead in time and especially when living costs pinch to the substitution of other kinds of food for milk and milk products. This substitution necessarily takes place among those of the working class who must get their foods from the cheapest sources. These other foods are just as valuable for adults. That this competition is actual and not theoretical is shown by the decrease in sales by dealers when prices have gone up. Thus when the price of milk was increased from 8 to 9 cents per quart in Philadelphia in the autumn of 1916, the sales by seven large Philadelphia dealers fell off 20% at first and after three months came back to a steady loss of five per cent.

It is, therefore, important to the farmer, the dealer and the consumer that the price of milk should be kept as low as is possible in view of a fair and economic price to the farmer and reasonable profits to the dealer under most careful management. Only on such a basis can the entire dairy industry be at once developed and stabilized.

SUMMARY OF RECOMMENDATIONS

Production Costs

The Commission held public hearings in Philadelphia on November 3 and November 20 and in Baltimore on November 15. At these hearings evidence was taken from dairymen and farmers as to productions costs as well as evidence on other matters such as distribution costs. In addition letters were sent out asking farmers to send in on enclosed forms the itemized cost of producing milk. The results of this investigation are recorded (pages 10 to 14). As to the average cost of producing a quart of milk (page 11) Mr. Dunlop reported it as $.04 for the 101 farmers of Blair county, Pennsylvania. All other farmers reporting (86 in number) gave the cost of producing milk as $.053 per quart; counting the 101 farmers of Blair county as 101 (making 186 in all) the cost of producing a quart of milk was $.046. As to the average cost of producing a quart of milk, 19 reported it as $.03; 35 as $.04; 22 as $.05; and 7 as $.06.

It must be remembered that these costs of producing milk were for the year ending September 30, 1916. Charts and figures are given (page 15) showing the general increase in the labor cost and other factors in milk production as revealed by figures from the national census and similar state and national reports. Items in production costs and in receipts per cow, as evidenced by special investigations (pages 10 and 11) and as given by a selected list of those farmers replying to the Commission's questions (page 16) are compared and the estimates as to the costs of producing milk during the present winter as given by Prof. Fred Rasmussen are included (pages 17 and 18). Prices received for milk over a term of years and at present are also given (page 12).

The tenant farmer who plays a very vital part in the total amount of milk shipped into the cities concerned usually considers his costs to be lower than does the owner farmer (page 21).

The Commission feels that the sanitary condition of milk and the per cent. of solids other than fats should both receive attention in setting the purchase price for milk as well as the content of butter fat (page 23). The supply of milk must be permanent and adequate to all community needs and to this end the price cannot permanently go below the cost of production and tendencies in that direction ought to be foreseen and forestalled (page 23). In determining the price that dairymen ought to receive or ask such facts and condi-

tions must be taken into consideration as the possibility of extension to further fields of supply; the production costs of tenant farmers and others who produce milk as a "side issue," and the lower costs of producing milk on lands peculiarly fitted to this industry (pages 23 to 24).

Profits can be increased i. e. production costs lowered: (1) by taking definite and drastic steps to eliminate "boarders;" (2) by increasing the yield per cow, per herd and per district; (3) by cooperation among dairy farmers in cow testing and bull associations; (4) through cooperative action with governmental authorities in maintaining the sanitary standards for milk production as outlined in this report in the section dealing with the Grading of Milk; (5) through scientific feeding; (6)through the keeping of proper cost records and (7) through a more extended use of county farm agents (pages 24, 25 and 26). The testimony on this subject of the dairy experts, Prof. Fred Rasmussen of State College of Pennsylvania, and Mr. G. E. Wolcott, Assistant Dairy Husbandman, Bureau of Animal Industry, United States, United States Department of Agriculture, are given in condensed form (pages 27 to 28).

Milk Distribution

A study of the sources from which in the main the cities of the three states concerned draw their milk supply (page 29) clearly indicates that all the cities of these central Atlantic States get their milk from practically the same territory and that this territory is getting to be at ever increasing distances from the city. Philadelphia, for instance, gets half its milk from a distance of 50 miles or over, and 60 per cent. of it from a distance of 40 miles or over.

Inasmuch as cases are now pending before the Interstate Commerce Commission for interstate rates and before the Public Service Commission of Pennsylvania for intrastate rates, the Commission decided it was inadvisable to make a special investigation of existing milk rates. On pages 35 and 36 are given the present rates and on page 37 the rates proposed by the milk dealers of Philadelphia. While passing no judgment on the reasonableness of the rates that now exist or are proposed, the Commission does call attention (page 37) to the importance of the rates to the farmer, the dealer and the consumer, and emphasizes (pages 37 and 38) the relation of the zone system to prices farmers in all the sections get for their milk. When, as is now the case, the price of milk is f. o. b. in the city, as it must be to get a common basis for rates among the farmers, the rate question becomes one that the farmers primarily are concerned with.

The Commission presents (pages 39-42) the itemized elements of cost in distributing milk as presented by certain dealers of Balti-

more and Philadelphia. These cost items, based on the number of quarts handled and sold, include the cost from and of the receiving stations for pasteurization and bottling, of route delivery, of stable expenses and of office expenses. The tables also present the amount of milk delivered per day, the total amount handled in 1916, and loss by evaporation and handling, the number of quarts handled by each of these dealers and the economies, if, any, these dealers see in the elimination of duplication of delivery.

The Commission recommends that the milk distribution business be regarded as a public utility, giving its reasons therfor (pages 43 to 44) discussing the alternatives thereto (page 45) and giving the new duties and privileges that will devolve upon the dealers and the state if this principle is recognized (pages 45 and 46).

The Commission points out the value of a steady price to the consumer (page 46) and recommends (page 46) that the common carriers centering in the leading cities of the states concerned make available to the press each week the total receipts for milk for the current week. The agreement made by the carriers when this recommendation was submitted to them is given (page 46).

The Surplus Milk Supply

Surplus milk, that is the excess of milk produced at certain seasons of the year above the normal consumption, has a very definite relation to the price that is and can be paid to the farmers for milk not only in the months of surplus but also in the months of scarcity. The Commission has given (page 47) careful consideration to the possibilities of getting rid of this surplus. These possibilities can be reduced to two: first, storing it for several months; second, special demands for milk at the time of the surplus season. The first can be effected by changing the milk into butter, cheese or condensed milk or by storage of the cream. The possible special uses of milk during the surplus milk season are for ice cream, for confectionary for condensed milk and similar purposes.

After consideration of the facts as to the manufacture and production of butter, cheese and condensed milk, the Commission finds that in these forms there is little hope for the disposal of the surplus. Likewise the use of whole milk for ice cream, for confectionery and for similar special uses, does not come at the time of greatest surplus but as is the case with confectionery at the time of greatest scarcity or as with ice cream right after the season of greatest surplus. Moreover, both of these are year long industries and not essentially seasonal industries. After consideration of these matters, the Commission concludes (page 51) that the principal factor in solving the surplus problem is to reduce the surplus as far as possible by a greater proportion of winter dairying—in other words—

by having a large proportion of cows freshen in and around August, September and October. To accomplish this purpose, a much greater difference must exist between summer and winter prices for milk than now exists.

Grades of Milk

One of the important duties of the Commission has been to study the quality and wholesomeness of the milk supply for direct consumption in the various municipalities of the states concerned in its relation to wholesomeness as food and as to prices (page 52).

The main reason for the grading of milk is that the consumer may get what he pays for and that the producer may get a price based on what he really sells. The present inspection of milk, especially as to its sanitary condition, is entirely inadequate as evidenced by the situtation in Philadelphia (pages 52 and 53). The Commission recommends the adoption of uniform grades of milk. In addition to certified milk, the Commission recommends three grades, grades A, B and C. Standards for each of these grades are given (page 53) as are the recommendations for solids other than fat and for fat (page 54). Present legal standards are compared with the minimum requirements recommend (pages 54 and 55). As to the licensing and inspection of milk, which is the only means of assuring proper standards in the production and distribution of milk and in the purchase and sales price for milk, the Commission recommends (page 55) that: (1) permits should be issued to producers and (2) to all distributors and receivers of milk; (3) that all milk brought into the state from outside must be inspected and sold under the provisions of a special permit to be issued by the proper state authority; (4) that the basis of inspection should be the government's score card or its equivalent system; (5) that producers premises should be inspected as to sanitary conditions at least three times a year; (6) physical examination of all animals producing milk for sale at least twice a year under the direction of the proper state board; (7) that the inspectors shall be appointed by the State Board of Agriculture or Agricultural Commission for a list of men submitted by the State Agricultural College and (8) that milk testers shall be licensed after proper examination. The Commission approves in general principles a law (pages 56—61) incorporating these various suggestions as drawn up for enactment in Pennsylvania.

The Food Value of Milk in its Relation to Price

Milk is an absolute requisite for children (page 62) and as compared with other animal products (page 62) it is relatively a very cheap food. A quart of milk is the equal in food value of eight eggs. Thus with milk at nine cents a quart and eggs at forty-

five cents a dozen, the consumer pays 3.3 times as much for the same food value when buying eggs as when buying milk. With round steak at 28 cents a pound, the consumer pays 2.3 times as much for the same value as is found in a quart of milk at nine cents. But when milk is compared with foods available from plant sources (page 63) it is found to be not as cheap a food as are plant foods. And in spite of the fact that we as a people are, next to England, the heaviest consumers of animal products in the world (page 64) the lower food value of milk as compared with vegetable sources does lead to a diminution in the amount of milk actually consumed when the price is distinctly raised. This evidenced by the falling off of consumption when the price of milk was raised last autumn in Philadelphia (page —) Moreover, the per capita consumption of milk increased rapidly during the years from 1901 to 1915 when the price was stable at eight cents per quart (page 64). It is important, therefore, to the farmer, the dealer and the consumer that the price of milk should be kept as low as possible in view of a fair and economic price to the farmer and a reasonable profit to the dealer under careful management. Only on such a basis can the entire dairy industry be at once developed and stabilized.

Acknowledgments

The Commission does not at this time name those institutions and individuals to whom we are and have been under special obligations for assistance of all kinds and for the splendid spirit of co-operation that made it possible for the Commission to get facts from whatever source it desired the facts. Farmers, dealers, experts, common carriers, educational institutions and the individual members of the staffs of educational institutions, have all responded to every request of the Commission for assistance or information with rare exceptions. Moreover this generous response was made despite the fact that it was often accompanied by no little money cost or personal sacrifice. Acknowledgment is given in most cordial terms for all this assistance. Special credit must be given to Instructors Rex Tugwill, R. H. Lansburgh, C. E. Reitell and Bruce D. Mudgett of the University of Pennsylvania who gave largely and freely of their time in compiling data and tables and making charts. Special acknowledgment is also due to those who, through Mr. Clarence Sears Kates, gave the financial assistance necessary fo rhaving stenographic records taken of public hearings and special investigations made without which the Commission's work would have been unavailing.

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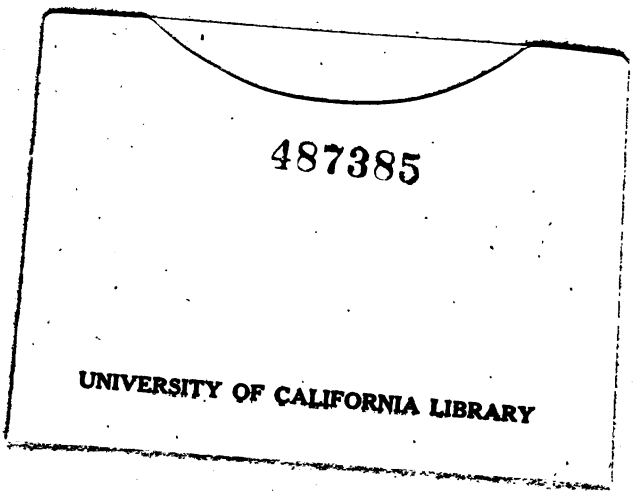
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